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The Journal OF Nervous and Mental Disease

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Original Articles

DISEASE AND SYMPTOMS. A PLEA FOR WIDER GENERALIZATION[1]

By E. W. Taylor, M.D.

The custom of opening the meetings of this Association with a formal address by its presiding officer was inaugurated in 1886 by one of its most distinguished and still active members, Dr. Charles K. Mills. These addresses have varied from scientific contributions of value, of which the first and many of its successors have been notable examples, to discussions of a more general character regarding the bearing of our special field on the body of medical knowledge, and its relations to the still larger affairs of the world as exemplified in the address delivered by your last president, Dr. Lewellys F. Barker. I feel at liberty, therefore, to range myself for a few moments to-day with the theorists, rather than with the scientists and to draw to your attention in cursory fashion some of the tendencies which to my mind are, or should be, influential in shaping our progress toward a deeper understanding of the fundamental matters with which as neurologists we are concerned.

It is not open to question that our field—the nervous system—broadly considered, touches not only medicine at every point, but reaches distinctly beyond into the world of social and political affairs. It will doubtless increasingly become our function to interpret the collective movements of men in terms derived from the

[1] Presidential address before the American Neurological Association, May 21, 1917.

individual study of man whether on the material plane of organic reflex activity or in the more elusive, but no less significant sphere of the emotions and the mental reactions. The somewhat dramatic mechanistic conceptions of Crile[2] and the broad generalizations of Prince[3] in his recent admirable address delivered in Tokyo on "A World Consciousness and Future Peace" may serve to illustrate what I mean. It is surely a notable fact that in these larger fields we are no longer satisfied with vague unsubstantiated statements however strong the emotional appeal may be, but are demanding a rationality of interpretation as never before. This tendency it is the function and privilege of our association to foster and develop.

With these broadly biological and sociological phases of our work, however, I am not at this moment concerned. I desire rather to call to your special attention two apparently opposed tendencies which I may term, first, the tendency to minute classification and, secondly, the tendency to wide generalization. These two seemingly antagonistic factors are certainly inherent in all progress. Their relation to each other, however, is a matter of the utmost consequence, since in our search for principles we are in constant danger of being overwhelmed by details. To be more concrete, there appears to be an almost intuitive tendency, even in the trained medical mind, to classify on insufficient evidence, to single out groups of symptoms and to name such symptoms diseases. By this means it must frankly be admitted that medical knowledge has grown and very possibly it could have grown in no other way, but it is no less apparent that progress has again and again been checked in its onward course by this bondage to names. Ignoring for the time being conditions primarily manifesting themselves outside the nervous system, there is no difficulty in multiplying examples.

What a wholly inadequate term, for example, poliomyelitis or, in its popular form, infantile paralysis, is to describe the widespread infection which we now recognize this dread disease to be. By insistence upon paralysis as a fundamental sign and the ventral horns as the sole seat of the causative lesion, we have ignored for years the vital fact that the paralysis is merely an incident and, except for its dire consequences to the individual, an insignificant one. Our present knowledge has come only through wide generalization on the basis of studies which extend far beyond the

[2] Crile, The Origin and Nature of the Emotions, Philadelphia, W. B. Saunders, 1915.

[3] Prince, Journ. Abnormal Psychol., 1917, XI, p. 287.

range of the nervous system. We all know the hair-splitting discussions which have centered about so-called Landry's paralysis. Landry, in 1859, described a condition well and accurately in its clinical aspects, which at the time in which he wrote, appeared unique and distinctive—a new disease. The new entity was rather eagerly accepted and we have been struggling ever since to keep it alive. It still, I am well aware, has its able supporters, but no one will question that we are hearing less and less of Landry's acute ascending paralysis and more and more of ascending or Landry's type of poliomyelitis. Is it for a moment to be supposed that this paralytic type, the etiology of which Landry never attempted to define, stands isolated among the infectious processes? Is it not rather but one trifling manifestation of a far-reaching infective agent, the full significance of which we are just beginning to appreciate?

The epileptic attack has long enslaved the medical mind as a criterion of importance. It has been described in minutest detail, the attempt has been made, often with brilliancy and acumen, to differentiate this type of attack from all other varieties, to isolate more and more completely on this basis what we shall designate as epilepsy and to place this artificial unit of disease in the niche reserved for it alone. The attempt so to circumscribe this great neurosis, or whatever it may ultimately prove to be, has resulted in failure, as all such short-sighted attempts are bound to result. Epilepsy in our present view is certainly not the seizure but something of far wider significance in the constitution of the individual, as pointed out most recently by the broadly conceived work of MacCurdy and Pierce Clark. Epilepsy, if we must still retain the name, is rather a condition as yet most imperfectly defined, of which the seizure is, no doubt, one of the minor manifestations. The occasional diagnosis of the disease many years before the appearance of the tell-tale attack (Clark) or the explanation of a previously bizarre and unexplained condition by the onset of seizures, as in a case which I have recently observed, or again the complete disappearance of seizures, with supervening dementia (MacCurdy), are observations which are beginning to bring the evidence we need to rehabilitate the disease on a broader, if less tangible plane. We progress somewhat when we speak of epilepsies instead of epilepsy, but we shall progress still more when we come to include all seizures from whatsoever cause—trauma, intoxication, tumor, even hysteria and possibly the migrainoid attack as symptoms of something about which we as yet know little, but

of which we may doubtless learn much when we face our problem broadly: when we learn to generalize before we particularize.[4]

Syphilis is another case in point. The story is a familiar one. With the discovery of the causative spirochete, syphilis has taken its place beside tuberculosis, like it in many of its pathological manifestations. The clear necessity has come for a re-classification on a broader and more comprehensive basis of the entire group of conditions included under the term syphilis. Para- and meta-syphilis must go and the two widespread diseases to which these terms have chiefly been applied are already taking their proper place simply as phases or varieties of syphilis, thanks to the discovery and demonstration of the causative agent. This is unquestionably progress and yet it is quite contrary to that spirit of minute inquiry which finds satisfaction in dividing and classifying to the end that new disease entities may be established. Raecke,[5] eulogist of the late Professor Alsheimer, in his enthusiasm over the fact that Alsheimer was the first to found psychiatric diagnosis on an histological basis, admits, it is a matter of regret, that he (Alsheimer) with unending pains, lays stress rather on the differences than the similarities between paresis, tabes, and cerebro-spinal syphilis before the discovery of the spirochete demonstrated their essential unity. It is unquestionably far easier to see superficial differences than fundamental similarities. Is it to be doubted that in the immediate future we shall find the artificial barriers between the so-called syphilitic diseases breaking down, that transitional forms hitherto ignored because they did not fit into a preconceived cate-

[4] "There is probably no disease which has been recognized as a clinical entity for over two thousand years and of which we know as little as we do of epilepsy. Proof of this is given by the fact that equally competent authorities view its essential pathology as intracerebral, metabolic, or psychological. Under the circumstances, we can not avoid the conclusion that the proof any one of these schools brings forward is not final and that therefore the specific foundation of the disease is yet to be discovered—or, at least, demonstrated . . .

"A cursory examination of the literature on epilepsy might lead one to suspect that there could be little left to learn of the disease, with its thousands of pages of histopathological, metabolic, and even climatological investigations. Yet no disease has had so one-sided a study. Few observers have been able to withstand the temptation to 'elaborate the obvious'—in this case to study and restudy the convulsive phenomena."—MacCurdy, Psych. Bull., 1916, IX, 187.

[5] Man mag vielleicht heute bedauern, dass der Autor in seiner vorsichtigen Art es vermied, aus seinen schönen histologischen Bildern direkt auf die lokale entzündliche Natur des paralytischen Gehirnprozesses zu schleissen, dass er aus differentialdiagnostischen Erwägungen heraus mehr das Trennende als das Verbindende zwischen Paralyse, Tabes, Lues cerebrospinalis betonte. Heute, wo wir im paralytischen Grosshirn die Spirochäten aufzufinden gelernt haben, ist überhaupt die Lehre von der Paralyse in ein völlig neues Stadium getreten.—Raecke, Arch. f. Psych. u. Nervenkrank., 1916, LVI, Part 2, p. vi

gory will increasingly gain in prominence until the very names which we have been using will gradually lose their significance in the interest of a broader generalization? Barrett[6] in a recent article points out the pertinent fact that the general application of the Wassermann test and the study of the cerebro-spinal fluid has demonstrated that cases exist which do not fit the hitherto accepted types of syphilitic psychosis, but which nevertheless show, serologically, the pathological changes of that disease. Varieties of disorder based on a common etiological factor, we may properly expect to uncover in increasing number, but let us not too soon attempt to establish individual entities, to which we force the facts of observation to conform.

When we approach that vague field of the psychoses and psychoneuroses, where our steps are at best uncertain, and our prejudices proportionately rampant, we should certainly clothe ourselves with humility. Here, especially, the mantle of charity should be thrown over our struggles for new light. Many years ago (1904) in this room Dana described the "partial passing of neurasthenia," a significant precursor of the buffeting to which it has since been subjected as an adequate name for an inclusive disease entity, and yet within a few weeks Dercum, an ardent supporter of the old order, has argued anew for its retention as a useful and circumscribed term, together with its ancient companions, hysteria and hypochondria, and its newer congener, psychasthenia. It should certainly be possible for fair-minded men to see the virtues in the old and yet at the same time to welcome the dawn of a new era. In the chaos of ideas and varying viewpoints which is bound to prevail in the confusing field of mental disorder, is it not a fair assumption that here again we have tended too much to particularize, to see entities where only symptoms or personal reactions exist, and to establish so-called diseases or syndromes, if you wish, without further attempt at definition, on the insufficient data thereby afforded? The pitfalls into which this very natural tendency to accept form for substance has led, should influence us toward an incessant search for principles of universal application. The value of the reclassification of mental disorders, due largely to the generalizing mind of Kraepelin, lies in the fact that he has conceived, as a working basis, groups of larger inclusiveness in place of the weakly descriptive terms of earlier writers. He has seen tendencies where others, naturally with notable exceptions, had seen only predominant symptoms, but even here there are signs

[6] Barrett, Journ. Am. Med. Assoc., 1916, LXVII, 1639.

that the domination of terms, dementia præcox, for example, is likely to obstruct and impede free thinking. To my mind the significance and permanent value of the disturbing innovation with which the name of Freud is associated lies not in its details or even in its accomplishments, but rather in its method of approach to fundamental questions, as admirably expressed by Trotter[7] who writes with no medical prejudice. "Whatever value," he says, "psychoanalysis may prove to possess in solving the peculiar difficulties of psychological research, the evolution of it marks a very definite advance in principle and shows that it is the product of a mind determined by whatever effort, to get to close quarters with the facts." This seems to me an eminently fair statement. If we, as clinicians, could find some common ground of departure, some principle or principles of generally accepted significance as, for example, we accept the bacterial origin of certain diseases, it is not to be questioned that we could then construct our clinical groups without acrimony and controversial bitterness. That such a principle has yet been found I am not prepared to say, but those who are seeking the fundamentals should at least command our respectful consideration.

In the foregoing somewhat discursive remarks I have attempted to emphasize the fact of which I am convinced we are constantly losing sight, that especially as neurologists we need to distinguish more sharply between the essential and the fortuitous; to lay our foundations firmly before we attempt to erect our superstructure of disease units. The difficulties are apparent and, many may be tempted to say, unsurmountable, especially in the field of psychoneurotic and psychotic disturbances. We are overwhelmed with symptoms, the pathological anatomy is vague and the etiology is lost in confusion and speculation. What we may properly call a disease emerges only when its cause, its pathological anatomy and its resultant and inevitable symptoms are known. For obvious reasons the nervous system, especially in what I may call its functional aspects, lags far behind and no doubt must continue to do so until causes are definitely ascertained and universally accepted, if this be ever possible. In the meantime we should be content with more careful observation and study of the facts and with fewer dogmatic diagnoses. I am not sure that we should not progress more rapidly if all our terms could be forgotten and we could begin anew our study, unhampered by the traditions and terminology of the past. It has recently been reported to me,

[7] Trotter, W., Instincts of the Herd in Peace and War, T. Fisher Unwin, London, 1916, p. 71

on what authority I do not know, that at one of our leading psychiatric hospitals, diagnoses were no longer made, to the end, no doubt, that the patients might be more, not less thoroughly studied.

It would take me too far afield to discuss at any length the relation of what I have tried to express to the vitally important matter of the teaching of neurology and psychiatry. Somehow we have failed to impress the importance of our subject upon the medical schools.[8] We still occupy a pitifully insignificant place in the curriculum; we are regarded as dealing with a specialty rather than as concerned with the most far-reaching and permeating branch of medical training.[9] This is indeed unfortunate and the reason is perhaps not easy to discern, but I am inclined to think that the fault lies largely with ourselves. Our teaching is desultory. We attempt at once to teach too little and too much. We fail to make clear to our students and so, indirectly, to our older and perhaps over-critical colleagues the fundamental principles we should be striving to establish. We are befogging the main issue by attempting to teach the multitudinous details of what we call "diseases," which, after all, constitute too often merely a shifting panorama of symptoms. We divide and subdivide, classify and reclassify, to the neglect of the general standpoint, which must underlie any rational conception of disease. Speaking of psychiatric diagnosis, Barrett in the paper to which I have before alluded, sums up the matter when he says: "The psychiatric point of view has been turning away from nosologic distinctions toward regarding many of the functional psychoses as individual types of reaction to personal experience." This idea, in principle at least, may well be extended beyond the field of the psychoses and neuropsychoses. As teachers we surely need to generalize more and particularize less. This naturally applies especially to the field of human conduct, with which so large a part of our work is con-

[8] Vide T. H. Weisenburg, Neurologic Teaching in America, Jour. Am. Med. Assoc., 1908, LI, 1, and W. W. Graves, Some Factors Tending Toward Adequate Instruction in Nervous and Mental Disease, Jour. Am. Med. Assoc., 1914, LXIII, 1707.

[9] "The efforts to remedy the present neglect of the study of the brain and nervous system are few, because the interest of the general public has not been aroused to the necessity for it. It is a most curious comment upon the lack of interest shown in our universities and institutions devoted to research, that so little attention is paid to making any adequate provisions for increasing our knowledge of these organs—the brain and nervous system—which are commonly esteemed to be the chief stock in trade of institutions of learning. While encouragement is given to those who delight to speculate upon man's place in nature, practically little has been done to assist in the determination of those structural and functional differences of the nervous system that are responsible for our elevation above the plane occupied by our simian ancestors." Paton, Science, 1917, XLV, 178.

cerned, but, as I have attempted to point out earlier in these remarks, the tendency to place a false emphasis on symptoms and unessentials is hardly less apparent in the structural field. Would not our teaching be more effective and our position more assured if we could lay our foundations deeper and leave behind many more than we have of our outgrown traditions.[10]

Many of you doubtless will say that I am tilting at windmills, that what I have tried to express is acknowledged and needs no restatement, that we are coming more and more to speak of syndromes, rather than of diseases, thereby avoiding the error of dogmatism. All this may readily be acknowledged, but I suspect that even a syndrome may become something of an obsession in the mind of its originator.

In this plea for broader conceptions and the breaking down of artificial distinctions, it need hardly be said that I would not in the least minimize the necessity for minute and painstaking investigation in all departments of our work. Such investigation is manifestly essential to the establishment of the fundamental principles upon which our ultimate clinical structures must rest. We should, however, place the emphasis where it belongs, to the end that we may not lose sight of the fact that the final aim of all investigation must be toward broader generalizations.

The work of Langley and Gaskell on the autonomic nervous system, the investigations of Sherrington on reflex activities, and of Cannon[11] and others on the ductless glands and their relations to the vegetative nervous system and to the emotions, have led to new and revolutionary conceptions of many hitherto elusive conditions, with the insistent demand for a new classification on a fundamental basis. Whether or not migraine or myasthenia gravis, for example, as suggested by Jelliffe and White, may properly be placed in the category of vegetative or visceral neurology, is perhaps open to dispute, but it is significant and encouraging that evidence is accumulating to demonstrate that they should be considered as symptomatic or syndromes, if you prefer, and not as diseases, *sui generis*. There seems to me no question that this readjustment is worth while and that we gain in knowledge in proportion as we progress in breadth of view.

We cannot now foretell where our newer conceptions are to lead, or what effect, to use Cushing's happy phrase, "the realign-

[10] A notable attempt toward this difficult ideal has been made by Jelliffe and White in their recently published text-book on "Diseases of the Nervous System."

[11] Cannon, W. B., Bodily Changes in Pain, Hunger, Fear and Rage, New York and London, D. Appleton & Co., 1915.

ment in greater medicine" is to have on our chosen branch—neurology. Surgery is more and more invading our field, or we are invading the surgical field, as you may wish to put it. Meningitis, chorea, poliomyelitis and now tabes and paresis finally firmly established as symptomatic of the disease syphilis, are likely to find a resting place without the neurological fold in final classification. The ductless glands, when their study has been further elaborated, will take with them into a new group a vast array of neurological symptoms. We already speak of hyperthyroidism instead of Graves' disease or the descriptive "exophthalmic goiter" and as in so many other conditions which we have been considering this "disease" will doubtless finally lose its individuality and be merged in a larger category. Behind all these changes is the entirely satisfying thought that we are progressing toward wider conceptions, that we are striving to see fundamental distinctions, that we are more and more relegating symptoms and groups of symptoms to their proper place as we grope for the conditions on which they depend.

We, as neurologists, may be destined to play a minor rôle in the changes which are now upon us, unless we widen our outlook. Five years ago, in a paper before this Society, Paton pointed out the fact that students of the nervous system may unconsciously acquire a narrow point of view, thereby restricting their field, and that the only hope of raising the study of neurology to a department of knowledge full of vital problems is to adopt the broad, biological viewpoint. The indications are multiplying that we must look especially for the new light, to the physiologists, to the biologists, and to all those men of science whose inclination and training lead them away from the details of the application of law, to law itself. It matters little, however, from what source our progress comes, provided only that our minds are alert to recognize and further it, whenever it appears.

THE EFFECT ON PAPILLEDEMA OF REMOVAL OF SMALL QUANTITIES OF CEREBROSPINAL FLUID BY LUMBAR PUNCTURE

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We have been able to observe three cases in which removal of a few cubic centimeters of cerebrospinal fluid has had a remarkable effect on swelling of the optic nerves. In the first patient, a decrease of one diopter was noticed after each lumbar puncture. Two of these cases from a preliminary examination strongly suggested brain tumor, but after a more careful study the diagnosis of encephalitis was made in one case and of pseudo-tumor from intoxication or infection in the other.

Case 1. T. R. H., aged 26 years, male, was in good health until he had an attack of grippe from December 9 to December 16, 1916. On December 29 he had a severe frontal headache lasting a few days, he felt badly and was confined to bed about nine days.

He was originally examined by Dr. de Schweinitz December 20, 1915, when he came for the relief of headaches and recurring conjunctival congestion. The vision of each eye was normal, as was also the amplitude of accommodation. There were no anomalies of the exterior ocular muscles, save only a very slight esophoria. Opthalmoscopically the eyegrounds showed no abnormalities. The refractive error, a moderate hyperopic astigmatism, was corrected, and these glasses, followed later by a submucous resection of the septum, performed by Dr. George B. Wood, entirely relieved the headache and conjunctival hyperemia.

On January 10, 1917, he came under the care of Dr. R. Max Goepp. His temperature at this time was subnormal and his pulse slow. He developed during a week's stay in the Methodist Hospital some weakness of mastication. He then went to Atlantic City, where he continued to have frontal headache and on returning after a week's stay, he felt nauseated and vomited, and he vomited occasionally later.

The patient was not seen again until January 24, 1917, when he was examined, at the request of Dr. Goepp, by Dr. de Schweinitz on account of violent headaches which had followed the attack of influenza in the early portion of December, 1916. The visual acuteness was normal in each eye, the amplitude of accommodation normal, and there were no anomalies of the ocular muscles, except a slight but distinct nystagmic jerk when the eyes were rotated sharply to the right. The pupils responded normally to all tests. Ophthalmoscopic examination revealed in the right eye a choked disc, elevated 4 D. above the surface of the eyeground. There were no hemorrhages, but the veins were very large and filled with dark-colored blood; a fine vascularity appeared throughout the edematous tissue. In the left eye there was a choked disc of 5 D. and in addition to this, numerous hemorrhages scattered on the outer side of the swelling and in the adjacent retina. The visual field for form and colors, measured with a 1 cm. square test, was not far from the standard size, a slight concentric contraction only being demonstrable, and that not more than 5 or 10 degrees.

He entered the University Hospital January 25 and came under the care of Dr. Goepp, Dr. de Schweinitz and Dr. Spiller.

An X-ray report by Dr. Pancoast stated that the patient had slight clouding of the right antrum and of some of the middle ethmoid cells.

Examination by Dr. Spiller showed that he had much weakness of the right muscles of mastication, very feeble patellar reflexes, and no Achilles reflexes. He had some light and dark granular casts in the urine. He was entirely normal mentally, and said that he first noticed difficulty in mastication January 14, 1917. In two days it became greater and was bilateral. He had difficulty in projecting the lower teeth in front of the upper, and in making the attempt to do this his lower jaw deviated to the right. At the examination it still deviated a little to the right when the mouth was opened, and he had more voluntary power in moving the jaw to the right than to the left.

On January 27 Dr. Spiller detected improvement in the condition of paresis of the right muscles of mastication. On January 28 Dr. de Schweinitz found the elevation of the right disc + 5 D. and of the left + 6 D.

The man continued to have frontal headaches, but had no impairment of sensation in the right fifth nerve distribution. There was further improvement in the condition of the right muscles of mastication on January 29.

Dr. George Fetteroff on January 29 found mild catarrhal inflammation of the posterior nasal sinuses, but concluded that the symptoms and examination indicated that the condition of the sinuses probably was not the cause of the choked discs. On January 30 the right muscles of mastication functionated as well as the left. Dr. Frazier did a lumbar puncture on this date. The pressure at the beginning of the flow was 17 mm. of mercury, the fluid was clear and contained 5 cells to the cubic millimeter. Only about 3 c.c. of fluid were removed. Dr. Kolmer found the Wassermann of the fluid negative with the most delicate antigen.

On January 31, Dr. de Schweinitz found the vision still normal and the fields unaffected. There had been a subsidence of 1 D. in each eye of the elevation of the choked disc, and the exudate, or perhaps more accurately the edema, had widened in area, and there were, in the right disc-head at least, a number of new hemorrhages. Dr. de Schweinitz commented that he had seen such hemorrhages appear after a lumbar puncture in similar circumstances and after cerebral decompression, and he thought there was no doubt that the puncture had reduced the elevation of the edema. Unless the neurological examination revealed definitely the presence of a tumor he did not see that there was at that time any justification for ceberal decompression.

Although it was fully recognized that the condition of the optic nerves suggested tumor, Dr. Spiller's diagnosis was encephalitis affecting chiefly the pons, probably from infection, possibly from the organism of poliomyelitis.

The patient was seen also by Dr. C. L. Dana, who formed the same diagnosis independently. Dr. Isaac H. Jones by the Bárány tests placed the lesion in the tegmentum of the pons, and as the condition improved these tests likewise showed the improvement. On January 31 Dr. Frazier removed 2 c.c. of spinal fluid and it dropped slowly.

On February 1 Dr. de Schweinitz reported O. D. swelling (highest point) plus 3, O. S. plus 4, a reduction of 0.3 of a mm., and no fresh hemorrhages.

It seemed well to omit the lumbar puncture on February 1, but on February 2 Dr. de Schweinitz found O. D. plus 4 at highest point. O. S. unchanged, plus 4. There was thus increase in the swelling of 1 D. in O. D.

On February 3 Dr. Frazier removed 3 c.c. of spinal fluid. Dr. de Schweinitz on February 4 found O. D. plus 3 D., O. S. plus 3 D., measured from highest point. O. D., temporal margin of disc distinctly seen, no fresh hemorrhages. Lumbar puncture was not done again.

February 4 Dr. Spiller found distinct improvement in the condition of the patellar reflexes. There had been some vertigo, probably because of the lumbar punctures. There was also return of a feeble Achilles reflex. Mercurial inunctions were begun on this date in the hope that they might diminish the swelling of the discs. Iodide of potassium was started February 1, for the same reason. There was every reason to exclude a diagnosis of syphilis.

On February 7 Dr. de Schweinitz found the measurements about the same as at the last examination, but he could see the margins of the disc more plainly in the right eye. On February 9 he reported there was still a slight decrease, O. D. plus 2 D., O. S. plus 2.5. The disc in the right eye was distinctly visible and the disc edge in the left eye was becoming visible.

On February 11 the right disc was only very slightly hazy but was practically normal otherwise. In O. S. the disc swelling was less than 2 D.

On this date the left patellar reflex was about normal, and the

right patellar reflex was stronger than it had been, the Achilles reflexes also were stronger. The man gradually made a complete recovery.

On February 21, 1917, the visual acuteness was as before, $\frac{6}{5}$ with each eye, and practically all traces of the disc-edema had disappeared. Only the lower edge of the right disc was slightly veiled, and on the left side there was slight veiling of the upper and lower edge of the disc. The retinal blood vessels had assumed a normal caliber and a natural color. There was absolutely no swelling of the disc above the surface of the eyeground, and no trace of the former hemorrhages. This examination has been repeated on several occasions since this date, and at the last examination, made April 17, even the slight veiling before referred to was scarcely demonstrable.

Case 2, Mrs. L. G. S., aged 19 years, was referred to Dr. Spiller, March 9, 1917, by Dr. C. J. Stamm. She had had headache all her life two or three times weekly. She probably had a miscarriage at the third month January 1, 1917. About the middle of February she suddenly noticed that her vision was blurred and that she had diplopia. She consulted Dr. Schneideman, who observed optic neuritis. She was then seen by Dr. de Schweinitz March 9, 1917. His ocular examination yielded the following results: Vision of the right eye, after the correction of a slight hyperopic astigmatism, $\frac{5}{5}$, missing two letters. Vision of the left eye, similarly corrected, $\frac{5}{5}$. The amplitude of accommodation was normal, and there were no anomalies of the pupil reflexes. There was an evident slight convergent strabismus, due to a paresis of the right external rectus muscle, the lateral displacement being fused with a 35 degree prism base out, and the vertical deviation neutralized with a prism 6 degrees base down, but testing the fields of diplopia failed to indicate definitely that any other nerve except the right abducens was affected. Ophthalmoscopically there was well-marked disc-edema without hemorrhages. The swelling of the right disc was plus 3.5, and of the left disc 4 D. above the eyeground. The veins were full, and contained blood darker than that which is normal. The visual field, tested with 1 cm. square white and colored objects, was normal in extent, and there were no scotomas demonstrable. She complained of much frontal headache and was given iodid of potassium, which soon produced an eruption.

She was first seen by Dr. Spiller March 9. The right external rectus palsy was very pronounced, but Dr. Spiller could find nothing further than the lesions reported by Dr. de Schweinitz. His examination was made about 3.30 P.M. Dr. Frazier about 7.30 P.M. the same day removed 4 or 5 c.c. of spinal fluid by lumbar puncture. The fluid was under slight pressure. Dr. Kolmer found 32 cells per cm., all mononuclears. The Wassermann and colloidal gold tests were negative. Dr. Pfahler had found nothing distinctly abnormal in the head by X-rays. When the patient was seen by Dr. Spiller March 10 at 12 o'clock noon the external rectus palsy had almost disappeared and the diplopia had entirely disappeared. Lumbar puncture was attempted twice later but no fluid was ob-

tained. The patient was seen also by Drs. Hansell, Fox and Reisman. She was not given mercury while under Dr. Spiller's care until March 14. Dr. de Schweinitz on the afternoon of March 10, 1917, found no change in the optic swelling but observed a recent hemorrhage in one eye and the improvement in movement of the right external rectus. Forty-eight hours later his examination showed that the convergent strabismus had entirely disappeared and diplopia could not be demonstrated in any portion of the field of fixation.

On March 13 there was no decrease in the swelling of the disc, but on March 17 Dr. de Schweinitz found O. D. no swelling of disc, outer and lower edges clear, some veiling of the upper and inner margins; O. S. Outer edge clear, other edges slightly cloudy, no swelling of disc. Form fields normal.

On March 27, 1917, the patient was again thoroughly examined, visual acuteness being normal, the amplitude of accommodation normal, and there was absolute orthophoria. The swelling of the right disc had entirely disappeared, faint veiling only being noticeable along the upper and lower disc edges. The swelling of the left disc had disappeared, but there was slight veiling of the upper, lower and nasal margins. No trace of the former hemorrhage which was noted in the right eye was discoverable. Her last examination April 24, 1917, yielded identical results. Complete recovery occurred in this case from a condition supposed by some of the physicians who had seen her to be brain tumor. Dr. Spiller's diagnosis in this case had been pseudo-tumor from infection or intoxication, possibly in relation with the miscarriage.

The complete disappearance of the diplopia in less than twelve hours after the removal of 4 or 5 c.c. of cerebrospinal fluid by lumbar puncture was truly remarkable.

Case 3, J. T., a boy about 16 years old, under the care of Dr. F. R. Packard, had right lateral sinus thrombosis. He was seen also by Dr. Newlin, by Dr. Spiller and others and a large clot was removed from the sinus by Dr. Packard on March 9, 1917. On March 15 the left external rectus muscle became paretic. This paresis was not present March 11. Dr. William T. Shoemaker found that the optic neuritis which was present before the operation was more marked on both sides.

Lumbar puncture was done March 17 and 34 c.c. of fluid were removed under considerable pressure. The fluid contained 5 cells, all mononuclear, to the cm. Smears and cultures were negative.

The paresis of the left external rectus had diminished on March 22, and gradually disappeared, so that by March 31 the movements of the eyeballs were full.

There was no improvement in the swelling of the optic discs by April 3. He was seen by Dr. de Schweinitz April 4 and he confirmed the findings of Dr. Shoemaker. On April 4 a lumbar puncture was done and 4 c.c. of fluid were removed under normal pressure. The fluid was clear and contained 330 cells to the cm., of which the mononuclears were about equal in number to the polynuclears.

On April 8 four days after the lumbar puncture, Dr. Shoemaker found the condition of both eyes improved. There was less infiltration of the nerve heads and surrounding retina and on April 14 he found the neuritis subsiding. On April 24 he found the disc margins still blurred, but they were less so than they had been, and the vessels were more nearly normal.

It is interesting to observe that this boy presented the symptom-complex of Gradenigo, but the external rectus palsy was on the side opposite to the lateral sinus thrombosis.

Lumbar puncture is occasionally followed by the subsidence of choked disc, very much as it occurs after cerebral decompression, and cases of this character may be found scattered throughout the literature. It is a well-known fact that the danger of lumbar puncture in brain tumor is often an imminent one, and that death has followed this operation in more than one instance. Indeed, in his discussion of lumbar puncture and examination of the spinal fluid in affections of the eye, James B. Ayer[1] says lumbar puncture is to be avoided in cases of heightened intracranial pressure where there is a subtentorial tumor, or at least, to use his expression, it is justified "only when there is much to gain, and then do it with your eyes open." He summarizes his discussion of this matter with the statement that the best contraindication of puncture is perhaps the presence of well-marked choked disc. Von Hippel is responsible for the statement that lumbar puncture is not justified where brain tumor is suspected. P. J. Hay,[2] in a review of the surgical treatment of optic neuritis, refers to the danger of lumbar puncture in brain tumor, which apparently he believes may be guarded against by withdrawing but a small amount of fluid at any one operation. The story, however, is a somewhat different one when the intracranial lesion is, for example, a meningitis. Thus, a typical type of improvement occurred in a case reported by Fraenkel, a woman of 21, with serous meningitis and double optic neuritis, vomiting, convulsions, and coma. Marked improvement followed lumbar puncture; indeed, on repetition of the puncture recovery ensued, with full vision and normal fundus one month after the onset of the disease. Similar observations are on record by Semple, and Hay, to whom reference has just been made, refers to the value of this procedure in tuberculous meningitis with optic neuritis, but points out that most of the records of improvement in this regard were observed more than ten years ago. In a discussion before the Society of Ophthalmology of Paris, Fage makes reference to the

[1] Trans. Amer. Ophth. Soc., Vol. XIV, p. 205.
[2] The Ophthalmoscope, 1909, p. 167.

value of this procedure in meningitis and in papillitis dependent upon fractures of the base, and reports a case which justifies the faith that was in him. He also refers to its indifferent value in intracranial tumors.

It does not seem necessary to add to these references, and in general terms it may be concluded that lumbar puncture is not justified, except in very rare instances, where there is a definite recognition that the increased intracranial pressure is due to cerebral or cerebellar tumor. But in meningitis, apparently in encephalitis, and in some forms of optic neuritis dependent upon a toxemia, for example, the influenzal types of optic neuritis, and perhaps in disc-edema dependent upon fracture of the skull, according to the report already referred to, it is a procedure worth careful consideration. Where there is doubt as to the possible existence of tumor it would seem from the first two cases described in this paper, that small quantities of cerebrospinal fluid may be removed by lumbar puncture with little danger and with most beneficial results.[3]

[3] Note in correcting the proof. We are aware that occasionally such a procedure is followed by undesirable consequences, as has been emphasized recently by Newmark and Beerman (Medical Record, April 28, 1917), but a papilledema of five or six diopters is so grave a condition that lumbar puncture with the withdrawal of a small amount of fluid, even though brain tumor cannot be absolutely excluded, would seem to be a safer procedure than the more formidable operation of cerebral decompression, and certainly indicated in preference to temporizing measures.

VIRILISM—FORME FRUSTE

(A Preliminary Report)

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I

In their classical monograph on Diseases of the Suprarenals, v. Neusser and Wiesel write: "We know very little about the functions of the suprarenal cortex. What we do know might be more truthfully termed, not the functions of the cortex but of the chromaffine cells. . . . Of the symptoms due to hyperactivity of the cortex, we know nothing."

The starting point of the present inquiry developed from a consideration of those rare and extraordinary cases of hyperplasia or neoplasia of the suprarenal cortex, in which the cardinal syndrome was the development of heterosexual characteristics in the female.

The question proposed itself—granted this group of cases, may not attenuated or incomplete forms of the syndrome exist; in a word, may we not find "formes frustes?" If this proved true, we were then on the way to strengthen a chain of presumptive clinical evidence pointing to cortical function.

Before entering upon this matter, however, it is advisable to outline the essentials of our present knowledge of the suprarenal cortex.

Morphologically and genetically, the suprarenal medulla and cortex represent two totally distinct organs. The first is of sympathetic origin, the second of epithelial origin. The cortex is developed from the Wolffian ridge, from the mesothelium of the mesoblast, and has, therefore, the same anlage as the ovaries and testes. In the lower animals, the separation into two systems, the so-called interrenal and suprarenal, is persistent and complete (Poll). Why there should be a gradual fusion of these two totally distinct tissues in the ascending animal series is still unknown.

In addition to the suprarenal gland proper, it is important to remember that suprarenal tissue may be found in the most diverse parts of the body. These accessory suprarenals, or suprarenal

rests, may consist of medullary substance only, of cortical substance only, or of both cortex and medulla. The last are very rare. Recent research has shown that the bodies are cortical in the vast majority of cases. They may be located in the suprarenal gland itself, either capsularly or subcapsularly, or within the medulla, and have frequently been mistaken for adenomata.

Extraglandular rests are far from uncommon. Wiesel found them, for example, in the neighborhood of the epididymis in 76.5 per cent. of newborn children: Neusser, in 92 per cent. of cadavers, most frequently on the under surface of the liver. Not uncommonly, they have been reported on the genitalia, male and female, on the round ligaments, spermatic veins, ovaries, testes, vas deferens, plexus pampiniformis, etc.; likewise in the inguinal canal, pancreas and kidneys. It appears certain that these bodies have a physiological significance which is not to be underestimated, as is shown by their compensatory hypertrophy in mammals following the removal of the suprarenals (Stilling, Wiesel, et al.).

The following facts are also of importance:

Removal of the suprarenal cortex, provided it is not vicariously compensated for by high developed accessory interrenal tissue, as in the case of the rat, appears to be incompatible with life (Biedl).

The lower the order of vertebrates, the proportionately greater is the adrenal system, the proportionately smaller the cortical or interrenal system.

The interrenal system shows a marked tendency to increase in volume in the course of the growth and development of the individual.

The most characteristic structural constituent of the cortical cells is supplied by the lipoid granules which they contain, the so-called cortical granules.

Three theories have been proposed to explain cortical function:

1. The cortex is a neutralizing or detoxifying organ, with the power to destroy toxines, both endogenous and exogenous (Bonnamour, Abelous and Langlois). In support of the theory is urged the high lipoid content of the tissue which, a priori, would be regarded as particularly suited to absorb and neutralize products of metabolism, and which Myers has shown will neutralize cobra venom in vitro. Furthermore, the fact that marked structural changes occur in the cortical cells and lipoid granules, both in infectious diseases and experimental poisonings with bacterial and metallic substances (Oppenheim and Loeper, Bernard and Bigert). The theory is by no means established. On the other hand, in ex-

perimental diphtheria, general sepsis, tetanus, etc., the suprarenals appear to be particularly vulnerable, especially the cortical portions. These show all the signs of an acute inflammatory process, including foci rich in bacteria, an acute suprarenitis (Beitzge, Bates).

B. The cortex secretes the mother substance of adrenalin, which is then elaborated and completed in the medulla (Schäfer, Herring, et al.). The experimental evidence for this hypothesis is slight and not convincing.

C. The cortex, or better said, the interrenal tissue as a whole is a true endocrine gland and supplies a specific hormone to the blood stream. It exercises either directly or indirectly an assimilatory influence upon the somatic and psychic development of the individual, especially in so far as it concerns the development of the sexual glands and those changes, psychic and psycho-physical, which occur during puberty (Biedl, et al.).

Is there any evidence for this assumption?

1. *The Evidence from Animal Experiment and Allied Observation.*—The adrenals enlarge during œstrus. Stilling observed an enlargement of the adrenals of male rabbits during the breeding season; also seasonal variations in the adrenals of frogs. During the summer, the peripheral part of the cortex contained certain peculiar elements—"summer cells," which atrophied when the sexual glands began to enlarge and pairing took place. Aichel likewise noted an hypertrophy of the adrenals of birds and certain amphibia during the breeding season. Guieysse found a marked enlargement of the cortex in pregnant guinea pigs. His observations have been confirmed by Ciaccio and Da Costa. Marassini and Cecca observed an increase in the weight of the suprarenals after castration, due chiefly to hypertrophy of the cortical substance. According to Theodossief, extirpation of the ovaries of dogs is followed by suprarenal hypertrophy, chiefly of the glomerulosa. Feodossiev and Lionbimov noted a marked hypertrophy of the suprarenals in dogs ten months after ovarian extirpation. Schenck castrated one male and 11 female rabbits, and found in all a widening of the cortex, particularly of the zona fasciculata. Soli likewise observed an enlargement of the suprarenals of guinea pigs following castration, but this hypertrophy disappeared entirely toward the end of the second month, the suprarenals eventually becoming smaller than the controls. According to Schenck, widening of the cortex occurs in the menopause and after castration in man. This is accepted by Schickele, but denied by both Poll and v. Neusser. A striking resemblance exists between the cells of the

adrenal cortex and the corpus luteum verum. Mulon even goes so far as to call the corpus luteum of pregnancy a temporary cortical adrenal body.

2. *The Evidence from Cortical Hyperplasia and Neoplasia.*—We come now to that strange group of cases, mentioned earlier, in which new growth or hypertrophy of the suprarenal cortex has been found associated with bizarre but definite disturbances of the genitals and secondary sex characteristics. The syndrome has been studied particularly by the French, who have termed it the syndrome génito-surrénale (Gallais). The symptomatic triad consists of hirsutism, adiposity and sexual disturbances. All sorts of fleeting transitions occur, from true pseudohermaphroditism to only relatively slight genital disorders. What gives unity to these cases and binds them together is the fact that regularly hyperplasia or tumor of the suprarenal cortex has been found. This fact is not without significance, if we recall that the suprarenal cortex and sexual organs arise from a common blastomere.

Since the external manifestations of the syndrome are very variable, dependent upon the period of life the individual is affected, it would be well to follow a definite scheme of presentation.

(*a*) *The Embryonic Period.*—Here the disturbance has begun well before birth. The type is the true hermaphrodite. The internal genital organs are female, the external organs male. At birth the infant has the appearance of a boy. The penis is usually well formed, at times a trifle hypospadic, the scrotum wide but not cleft, the testes, however, cryptic. The development is along the male type. The individual is regarded as a male, and at times has even married. Only at autopsy does one discover the presence of an uterus, tubes and broad ligaments. The uterine neck opens into a vagina, which gradually, narrowingly penetrates a well-developed prostate and enters the prostatic portion of the urethra at the level of the verumontanum. The prostate and urethra are of the male variety. The genital gland itself has almost regularly the structure of an ovary. In only one observation was it that of a testicle (Apert).

In all, there are twelve or so cases reported. In one or two neoplasm of the suprarenal cortex or accessory adrenals was found; in the others, with one exception (Walcker), an hypertrophy of the cortical tissue which is described usually as "enormous" or "very voluminous." This is the first significant fact; the second is, that with the exception of one case, all were female pseudohermaphrodites, that is, though virtually female, they presented the external sexual characteristics of males.

(*b*) *The Ante-Puberty Period.*—In this group of cases we must assume that the disease process does not occur in embryonal life, but in early childhood. The child has usually been full term, naturally delivered, and develops normally during the first months or years. Then sooner or later, signs of a precocious genital or psycho-genital development appear. These signs are of two orders, female and male. To the first order belong a precocious development of the external genitals—hypertrophied labia majora and minora, and of secondary hair, pubic and axillary; less usual, an enlargement of the mammæ and adiposity. Menstruation, however, does not occur. To the second order belong certain heterosexual signs, among which the most characteristic are hypertrophy of the clitoris to the extent that it may resemble a small penis with well-developed prepuce, lip, chin and body hair, and alterations of the voice. Male and female characteristics may be, and as a matter of fact are, often combined.

Here again, as in the case of female pseudo-hermaphrodites, we have a striving toward maleness. Autopsy reveals a tumor, adenoma, adenocarcinoma, or the still obscure sarcoma going out from the suprarenal cortex or accessory cortical bodies; or hyperplasia of the interrenal tissue.

(*c*) *The Period of Puberty and Adult Life.*—A case quoted from Gallais will prove more illuminating of this phase than any formal description.

The patient, a girl of nineteen. Menstruation began at thirteen; at fourteen dysmenorrhea developed, and with it nausea and vomiting. From fourteen to seventeen she exhibited a rapid growth of muscular power, associated with marked cerebral over-activity. Her character became transformed; she became violent and authoritative. Homosexuality developed. At seventeen she had crises of nausea and pain, palpitation, facial erythrosis, insomnia, motor agitation; at eighteen complete and final amenorrhea. Four months later there appeared a progressive and systematic hypertrichosis—black moustache and beard, and abundant hair on the pubes and lower extremities. Her facies at the same time became absolutely masculine.

The following month, what may be termed the second period began—progressive asthenia and emaciation, leading to death the same year.

Autopsy revealed a typical epithelioma, weighing 2½ kilos, of the left suprarenal cortex, with identical metastases in the liver and lungs. The right suprarenal was normal, likewise the pituitary. The uterus was small, the ovaries atrophied, containing a few scattered debris of the corpora lutea. No anomalies of the external genitalia were discovered, nor of the central nervous system.

This case is typical. Other clinical forms exist, however, associated with cortical tumor, in which the manifestations are much less striking and complete. Gallais records a case in which the tumor was associated with menstrual disturbances merely, and describes two other cases of suprarenal tumor associated with tubal pregnancy. All the cases so far reported—and this is important—have revealed malignant tumor going out from the cortical tissue.

The full-blown syndrome, in a word, is a syndrome of sexual inversion. Female characteristics disappear, male characteristics develop. A tabulation of the latter shows:

(*a*) Psychic alterations, egotism, aggressiveness, fits of temper and violence, irritability, dogmatism, extravagance, etc.—symptoms of psychic hypersthenia; sexual excitement; homosexuality.

(*b*) Increase in muscular power and work capacity—physical hypersthenia

(*c*) Hirsutism. This is of the secondary male type and may be either slight or developed to a marked degree. Hair appears on the lips, chin, cheeks, forming in certain cases a full moustache and beard. The normal hair configuration of the mons veneris alters and assumes a male type, running up the linea alba to the umbilicus and thence to the chest. The extremities are covered with thick, coarse hair, and at times also the back and shoulders.

Gallais has termed the clinical picture "le virilisme surrénal," and the term is a happy one. It is worthy of mention that the condition of the pelvic organs at autopsy has varied. The ovaries are described as normal or atrophic; the uterus as large, small or normal. None of the observations published are as detailed or complete as one could wish; yet the essential fact remains, that in all of them tumors of the interrenal tissue were found.

II

Does a form of virilism fruste exist?

If it can be demonstrated, the clinical chain in the dystrophy of masculinism is complete. Psychic alterations indicating a diminution or neutrality of female traits, with a tendency toward homosexual coloring, disturbances of genital function, somatic manifestations of contrary or hetero-sexual secondary characteristics—these we should expect to find either isolated or in combination.

The following observations represent unselected material. No negative or doubtful cases were rejected. This compensates in good measure for their relatively small number.

Observation 1. *Retarded and scant menstruation; miscarriage; subsequent sterility; hirsutism of male type.*

P. H. Russian Jewess, age 36. Wassermann —.

Complaint.—Headache. Family and past history negative.

Sexual History.—Menstruation appeared between 15 and 16, scanty but regular. Married 10 years. Coitus 1–2 times a week. No preventive measures. Miscarriage during first year of marriage. No subsequent pregnancy.

Physical Status.—Medium height, obese, fair. Face squarish; high cheek bones, heavy long bones. Skin thick, puffy, dry, of a myxedematous quality. Lobes of ears attached, helix roll very slight. Large, well-developed breasts. Thyroid not palpable. C. N. S. negative. Pulse 60. B. P. 140.

Hairy System.—Scalp hair, fine, blonde, abundant. Moustache of fine dark hair. Brows converge over root of nose. Medium long dark hair on upper extremities. Abundant coarse black hairs on lower legs, less on thighs. Long, curling black hairs at base of great toes. Mons veneris sparsely covered. Configuration, male, with fine black hairs running up linea alba to umbilicus. *Note:* hair has always been present.

Observation 2. *Sterility; hirsutism of male type.*

B. G. Irish, 60. Wassermann —.

Complaint.—Failing memory, dizziness, melancholy. Family and past history essentially negative.

Sexual History.—Menstruation began at 14, in general regular. Climacteric at 45.

Married 30-odd years: no miscarriage; never pregnant; grieves over her sterility.

Physical Status.—Small, wizened, careworn woman. Bones small, but heavy. Skin dry, wrinkled. Breasts small, atrophic. Thyroid not palpable. C. N. S. negative. Pulse 75. B. P. 170.

Hairy System.—Scalp hair abundant, coarse, black. Sparse, but well-defined male moustache of long, coarse black hair. Thick, bushy, extremely coarse overhanging eyebrows. Thick, coarse black hairs protruding from nostrils. Isolated coarse long black hairs on chin. Mons veneris only sparsely covered, of female configuration. Body quite smooth, lacking even lanugo. *Note:* Face hair present as long as patient can remember, but became coarser at the time of her change.

Observation 3. *Psycho-sexual infantilism; hirsutism of male type.*

E. N., Jewess, 36. Wassermann —.

Complaint.—Pain in the chest. Neurotic ancestry. Past history negative.

Sexual History.—Menstruation began at 15, always regular and natural. Married 12 years. Coitus 5–6 times a week. Sexual intercourse always extremely obnoxious—"Coarse and unnecessary." Worry and depression over her sterility. Extra-marital experiment equally disappointing. Sexual life on an infantile plane. Experiences the greatest sexual gratification through giving and receiving caresses. Has had two natural and easy pregnancies; children healthy.

Physical Status.—Short, rather plump, blonde. Hair dry, somewhat coarse. Breasts firm, well-developed. Vasomotor hyper-irritability. Thyroid just palpable. C. N. S. negative. Pulse 100. B. P. 120.

Hairy System.—Scalp hair yellow, luxuriant, coarse, dry. Brows finely pencilled, with isolated nasal root hairs. Moustache of fine pale hairs. Fine short down on temples, extending to brows and running down sides of cheeks. Fine down on shoulders and back, increasing in length over lumbo-sacral region. Pubic hair coarse, sparse, suggesting the male triangle through isolated coarse hairs running up to linea alba; thence fine hair extending up linea alba to umbilicus. Fine, pale hair on arms, coarser, longer and more abundant on lower legs. *Note:* Hair present since girlhood.

Gynecological Examination.—Uterus and cervix rather small.

Observation 4. *Delayed irregular menstruation; sterility; hirsutism of male type.*

C. B., Italian, 40. Wassermann —.

Complaint.—Pain and stiffness in right shoulder. Family and past history negative.

Sexual History.—Menstruation began between 17–18, always irregular. Married 20 odd years; never pregnant; no preventive measures.

Physical Status.—Medium height, heavy build, but not obese. Hair dark and dry. No abnormal pigmentation. Facial erythrosis. Thyroid not palpable. C. N. S. negative. Arthritis. Pulse 70. B. P. 150.

Hairy System.—Scalp hair black, oily, coarse. Well-developed moustache of thick black hair, curling at corners of the mouth. Isolated long black hairs on chin. Fine lanugo on cheeks. Isolated long coarse black hairs on lower legs, especially the antero-internal surfaces. Bunches of coarse black hair below patellæ. Few long black hairs on ankles and basal phalanges of toes. Pubic hair of female type; none on linea alba or chest. *Note:* hair noticed since girlhood, but has become coarser and more abundant the last few years.

Observation 5. *Femina frigida; pregnancies; hirsutism of complete male type.*

R. K., Jewess, 33. Wassermann —.

Complaint.—Sailing, swaying sensations, frequent sick headaches, profuse perspirations, pain in occiput. Thyroid enlargement, noted before marriage, increased after first and second pregnancies. Partial extirpation 4 years ago. Family and past history essentially negative.

Sexual History.—Menstruation began at 13, always regular; very painful before marriage, but not since. Married 10 years, two living children, 9 and 7, both frail; two miscarriages, 2 years and six months ago. Coitus 1–2 times a week, not painful, but has never been pleasurable. Is very fond of her husband, but is "cold" toward him.

Physical Status.—Medium height, thick-set, stoutish. Face brightly flushed, eyes moist. Skin of fine quality, but oily. Thyroid

enlarged. Marked dermographism. Breasts well developed. Pulse 110. B. P. 120.

Hairy System.—Scalp hair abundant, medium quality, oily. Brows thick, bushy, do not meet. Well-defined adolescent moustache of fine dark hair. Long isolated black hairs on chin. Fine black hairs on sternum. Isolated dark hairs on areolæ, which are deeply pigmented. Fine brownish hair on dorsal surfaces of arms. Abundant but fine long black hairs on antero-external surfaces of legs; thighs free. Short, coarse black hairs on bases of toes. Pubic and perineal hair profuse, of male type, with fine black hairs running whole length of linea alba.

Gynecological Examination.—No special abnormality.

X-ray.—No sella turcica disturbances or pineal shadow. *Note:* Moustache noted since girlhood becoming coarser; chin hair 6 months; chest hair 4 years.

Observation 6. *Sterility; hirsutism of male type.*

M. G., 65, German. Former midwife in Hegar's clinic. Wassermann —.

Complaint.—Shortness of breath, dizziness, tremor of head, numbness of fingers, palpitation (one year).

Sexual History.—Menstruation began at 13, always regular up to menopause at 45. Married 33 years, never pregnant; no preventive measures.

Physical Status.—Medium height, stocky, but not essentially masculine. Breasts flabby, atrophic: nipples flat. Thyroid not palpable. Pulse rate 80. B. P. 200.

Hairy System.—Well-developed dark moustache (present since girlhood). Fine dark hair on forearms. Long dark hair on lower legs. Pubic hair of female type. No linea alba hair.

Observation 7. *Femina frigida or possible latent homosexual; hirsutism of complete male type.*

S. O., 34. Spinster. Irish-American. Wassermann —.

Complaint.—Itching on neck and chest (2 months). Mother died of tuberculosis.

Sexual History.—Menstruation began at 15, regular, scant, painless. Has "never had any use for men"; women "much nicer." Does not wish to marry or bear children.

Physical Status.—Medium height, squarish build, suggests mannish type with strong muscular arms. Skin dark, oily. Facial erythrosis. Breasts firm and flat. Narrow pelvis. Pigmented patches on chest and abdomen. Tinea versicolor. Thyroid just palpable. Pulse rate 90.

Hairy System.—Scalp hair black, thinned and extremely oily. Brows rather thin, connected over nasal root by few fine dark hairs. Fine dark moustache (noted since girlhood). Scattered long, coarse, black hairs over sternum. Fine long black hair on forearms. Long coarse abundant black hair on thighs, legs, and bases of toes. Pubic hair abundant, of pronounced male type, forming an apex which runs up linea alba to umbilicus.

Observation 8. *Delayed irregular menstruation; very small uterus; sterility; hirsutism of male type.*

L. R., 45, Russian Jewess. Wassermann —.

Complaint.—Heavy feeling in epigastrium after eating; occurs only in winter; family and past history negative.

Sexual History.—Menstruation began at 18, scanty, always irregular, climacteric 7 years ago. Married 26 years; never pregnant; no preventive measures; sterility a great disappointment to her.

Physical Status.—Short, heavy, thick-set. Skin dry, harsh, of a myxedematous quality; shows deep folds. Pronounced transverse palatal ridges; Darwinian type of ear; breasts fairly developed; nipples flat; thyroid not palpable. Pulse 60. B. P. 180, aortic roughening. Palpable liver, palpable right kidney. C. N. S. exam. negative.

Hairy System.—Scalp hair dry, coarse, rather sparse, growing down cheeks like side whiskers. Dark, downy moustache. Fine dark hair on chin; fine dark hair generally distributed on forearms. Fine long black hair on lower legs. Patches of black hair on dorsum of feet and bases of toes. Pubic hair sparse, female. Few fine dark hairs scattered over abdomen. No linea alba preference.

Gynecological Examination.—Very small uterus.

OBSERVATION 9. *Probable sterility; very small uterus and cervix; delayed irregular menstruation; hirsutism of exquisitely complete male type.*

R. H., Jewess, 25. Wassermann —.

Complaint.—Paroxysmal pains in temples associated with nausea and vomiting (five years). Family and past history essentially negative.

Sexual History.—Menstruation began at 16; occurred only once first year; 2–3 times second year; irregularity continues, now every two months or so. Not scant nor abnormally painful. Married eight months; coitus several times a week; has not become pregnant, and is depressed in consequence. "My main reason for marrying was to have a baby."

Physical Status.—Small, slender, delicate build. Olive skinned, "chocolate eyed." Pigment eleswhere not abnormally dark or pronounced. Voice and manner feminine. Skin dry; small slender hands and feet; breasts well developed. Liver slightly enlarged and sensitive. Thyroid just palpable. Vasomotor hyper-irritability. Pulse rate 100. B. P. 130.

Hairy System.—Scalp hair medium quality, abundant, black, well-developed moustache of stubby coarse black hair. Chin shows black stubble. Eyebrows thick, coarse, but well defined. Luxuriant long black coarse hair on and about areolæ. Mass of hair of same quality on sternum, which is as covered as a hairy male (hair about 3 inches long). Fine dark hair on forearms, including dorsal surfaces of hands. Abundant coarse black hair on thighs, legs and basal phalanges of toes. Copious fine black hair of medium length in sacro-iliac region. Pubic hair abundant, of typical male type, running up to umbilicus and thence to chest (hair has always been present).

Gynecological Examination.—Very small uterus and cervix.

Observation 10. *Delayed menstrual onset; probable sexual frigidity; hirsutism of male type.*

A. S., Irish, 41. Wassermann —.

Complaint.—Pain in joints. Family and past history negative.

Sexual History.—Menstruation began at 18, always regular. Married 5 months. Married to have a home of her own. Is not "sentimental." No pregnancy.

Physical Status.—Angular, heavy bones, of masculine build, dark skin; thyroid not palpable; voice thin, whining; no pigmentation.

Hairy System.—Eyebrows tend to meet. Slight dark moustache, down on cheeks and chin. Fine long dark hair on radial surfaces of arms; coarser on antero-internal aspects of legs. Black hair on bases of toes. Pubic hair of female type. No linea alba hair. *Note:* hair present since girlhood.

Observation 11. *Psycho-sexual history not obtained; natural pregnancies; hirsutism of male type.*

M. M., Irish, 52. Wassermann —.

Complaint.—Sensation of cold in the extremities. Antecedent history negative.

Sexual History.—Menstruation began at 14, regular; easy climacterium at 40. Six children, one miscarriage. Psycho-sexual data not obtainable.

Physical Status.—Short, bulky, dark skinned. Voice rather heavy, but female. No pigmentation. Thyroid not palpable.

Hairy System.—Definite moustache of coarse black hair, ½ inch long (present since girlhood, but coarser and thicker since menopause). Silky blonde hair ½ to ¾ inches on cheeks and chin, less marked on neck. No arm or thigh hair. Lower legs practically free from hair, except for long black isolated hairs on ankles. Isolated black hairs on bases of great toes.

Observation 12. *Horror masculorum; probable homosexual; scant menstruation; hirsutism of complete male type.*

H. S., 39, spinster, American.

Complaint.—Pain in right arm. Family and past history negative.

Sexual History.—Menstruation began at 16, regular, scant, painful. Has never married. Men are extremely distasteful to her. Has lived for the past eight years with a female friend, but denies homosexual tendency.

Physical Status.—Medium height, squarish, masculine build, manner independent, authoritative. Movements quick, alert. Speech abrupt; voice low-pitched. Skin fair, rather dry. Breasts flat, nipples inverted. Thyroid not palpable. No abnormal or excessive pigmentation. Pulse 70. B. P. 130.

Hairy System.—Scalp hair abundant, rather dry. Eyebrows heavy, converge over the nose, with definite moustache of fine short dark hair. Down on cheeks. Several short black hairs on chin. Two or three isolated long black hairs on sternum. Fine dark hairs on forearms. Coarse abundant black hair on lower legs. Isolated hairs on insteps and bases of big toes. Pubic hair rather

sparse, but typically male, forming a wide triangle running up the umbilicus and connecting with the sternum through scattered long black hairs (hair always present, but growing coarser).

Observation 13. *Sterility; pigmentation; small uterus; hirsutism of male type.*

R. C., Russian Jewess. Wassermann —.

Complaint.—Depression, irritability, insomnia, palpitation—similar attack four years ago. Family history negative.

Sexual History.—Menstruation began at 14, regular. Married 11 years. Never pregnant. No preventive measures.

Physical Status.—Short, dark, rather obese. Dark pigmentation about eyes. Under left breast patches of dark brown to black pigmentation, varying from size of a penny to a dollar, with irregular but sharply defined outlines (noted for about five months). Thyroid not enlarged. Blood pressure 120. Pulse 108.

Hairy System.—Hirsutism of male type, except for pubes which has female configuration.

Gynecological Examination.—Uterus small; adnexia not palpable.

Observation 14. *Sterility; hirsutism of male type; positive Wassermann.*

A. L., German Jewess, 31. Wassermann +.

Complaint.—Insomnia, headache (4 weeks). Family and past history negative.

Sexual History.—Menstruation appeared at 14, always regular. Married five years; never pregnant. No preventive measures.

Physical Status.—Short, flabby, pale woman. Skin fair, dry. Eyes lusterless. Appearance and voice female. Breasts well developed. C. N. S. neg. B. P. 130. Pulse 84.

Hairy System.—Scalp hair dark and dry. Fine dark moustache. Brows meet. Fine dark hair of medium length on forearms. Long fine dark hair on legs and bases of big toes. Pubes show male configuration, *i. e.*, apical but no linea alba hair.

Observation 15. *Heterosexual aversion; hirsutism of complete male type.*

I. R., Russian Jewess, 18. Unmarried.

Complaint.—Pain in epigastrium after eating. Antecedents negative.

Sexual Life.—Menstruation since 16, regular. Is "repelled" by men. Will never marry.

Physical Status.—Short, heavy, dark. Hair and skin dry. Breasts large, well developed. Voice and manner feminine. Palpable thyroid. Pulse rate 120.

Hairy System.—Fine dark moustache. Heavy black convergent brows. Fine dark lanugo on back. Long dark moderately coarse hair on arms, legs and bases of big toes. Pubic hair typically male, extending copiously up linea alba to umbilicus. Above umbilicus well defined but less abundant.

Observation 16. *Femina frigida; sterility; infantile uterus; hirsutism of male type.*

J. T., 28, Hungarian Christian. Wassermann —.

Complaint.—Pain about waist line, right leg and knee, chiefly nocturnal. Duration 5 months. Family and past history negative. Husband healthy.

Sexual Life.—Menstruation began at 15, always regular, never much flow. Considerable pain up to two years ago, when partial removal of ovary for cyst. Married 7 years. Never pregnant; prays for a child, and has consulted several doctors. Coitus 2–3 times a week. "In love with her husband," but coitus, though not painful or uncomfortable, is quite without pleasure. Prefers that it not take place.

Physical Status.—Small, slender woman of pronounced Slav type, with blue eyes and light brown hair. Body of gracile build, with slender waist and narrow pelvis; hands and feet on contrary strikingly large. Feet broad, flat. Hands wide with large rounded fingers. Breasts small, of early adolescent type. Palate high arched; ear lobes attached. Voice and general habitus feminine. Considerable tenderness over lumbar muscles. C. N. S. exam. negative. Thyroid not palpable. Blood pressure 120. Pulse 88.

Hairy System.—Scalp hair light brown, of fine texture; grows down on temples. Brows coarse, rather sparse, especially in outer third, converge with a few isolated hairs. Fine, but well-defined moustache of pale short lanugo, becoming darker and coarser towards corners of mouth. Fine down on cheeks. Fine pale short lanugo on shoulders and back. Abundant fine dark lanugo over sacral region. Long fine dark hair over dorsal surfaces, forearms, extending on to backs of hands; also fine short dark hair on first and second phalanges of fingers. Fine long dark hair on thighs. Long coarse abundant black hair over lower legs. Long coarse curling hairs on basal phalanges of all toes. Pubic hair of mixed type, *i. e.*, mons hair feminine, but hair continued into anal region. Very fine lanugo all over abdomen, particularly along linea alba.

Gynecological Examination.—Small uterus. Cervix very small, anteflexed. No masses in adnexa.

Observation 17. *Marriage in menopause period; sterility; sexual indifference; hirsutism of male type.*

K. R., 44, American, Christian. Wassermann —.

Complaint.—Pain and deformity of fingers. Family and past history negative.

Sexual Life.—Catamenia began between 15 and 16. No menstruation for 8 months. Married one year. Not in love; has never been in love. "Has married for a home." Marriage so far sterile.

Physical Status.—Tall, coarse, large-boned woman. Hands very wrinkled. Shoulders wide. Breasts flat; undeveloped. Voice somewhat heavy. Thyroid not palpable. Pulse 90. Blood pressure 130.

Hairy System.—Light lanugo moustache; long pale coarse lanugo on cheeks and chin, with distribution of a full beard. Long fine pale hair on forearms, extending luxuriantly over dorsum of hands. Occasional long coarse black hairs on breasts. Long coarse dark hair on legs and bases of big toes. Pubic hair female. No linea alba hairs.

Gynecological Examination.—Small anteflexed cervix.

OBSERVATION 18. *Sterility; hirsutism of male type.*

B. S., 29, Russian Jewess.

Complaint.—Severe pain in arms and shoulders. Frequent swelling of hands (3 years). Family and past history without significance.

Sexual Life.—Catamenia began at 15, always regular. Married 13 years. Never pregnant. Anxious for children.

Physical Status.—Thick-set, heavy woman, of medium height. Flushed face and bright eyes. Large pendulous breasts. Flat nipples. Scanty perspiration. Hyperesthesia over both ovaries. General tenderness over brachial plexuses. C. N. S. examination negative. Thyroid just palpable. Blood pressure 145.

Hairy System.—Fine abundant scalp hair, forming apices over temples. Thin finely pencilled brows of sparse coarse hair, especially thinned at outer third. Fine pale lanugo moustache, dark at angles of mouth. Sparse fine down on cheeks. Arms almost free from hair, at most merely scattered fine lanugo. Long coarse scattered black hairs on lower legs, with fine short dark hair on bases first and second toes. Pubic hair female. No linea alba hair. Fairly abundant fine black hair over sacrum.

OBSERVATION 19. *Enormously hypertrophied breasts; infantile uterus; sexual frigidity; sterility; hirsutism of male type.*

I. K., 31, Austrian Jewess. Wassermann —.

Complaint.—Sensation in legs as if they were made of wood. Chilly sensations (1 year).

Sexual Life.—Menstruation began between 13 and 14, regular normal flow, not painful. Married one year. "Loves her husband, but is very cold to him." Coitus once a week, or less often. Gives her no discomfort, but is repugnant to her, so husband tries to yield to her wishes. No pregnancy, desires a child.

Physical Status.—Heavy, thick-set, stoutish woman, of medium height. Skin dark, smooth, dryish. Facial erythrosis. Bright moist eyes. Pigmented lids. Hands relatively small, squarish, with short blunt fingers. Extremities, particularly the feet, cyanotic, dry and very cold. Breasts enormous, reach down well below the umbilicus. Nipples, on contrary, small and flat. Thyroid just palpable. Occasional reduplication of heart beat. Radials very small, scarcely palpable. Dorsalis pedis pulsation. Blood pressure 120. C. N. S. examination negative. Sacro-iliac dimples.

Hairy System.—Scalp hair fine, fairly thick, dry. Eyebrows wide, hair coarse but not particularly thick; converge over nose, and curl upward at outer ends. Fine dark downy moustache, becoming coarser and darker toward the mouth angles (moustache present unaltered as long as she can remember). Fine down on cheeks. Fine short dark hair on forearms; scattered fine and medium coarse black hairs on lower legs and bases of great toes. Pubic hair female. No linea alba, breast, or perineal hair.

Gynecological Examination.—Uterus small, cervix very small and anteflexed. No masses in adnexa.

Observation 20. *Sterility; hirsutism of complete male type; an hairy male.*

J. S., 30, Russian Jewess. Wassermann —.

Complaint.—Pains all over. Headache (8 to 9 years). Mother died during confinement.

Sexual Life.—Menstruation began at 14, regular up to time of marriage, since then irregular and profuse. Relatively frequent during summer; very seldom during winter for past 8 to 9 years. Married 12 years, never pregnant. No preventive measures. Psycho-sexual data not obtainable.

Physical Status.—Short, thick-set, vigorous looking woman. Face large and round; skin rather dark. Skin of face brightly flushed, dry and harsh; of body, soft and smooth. Palms warm and moist. Extremity bones sturdy. Breasts fairly developed, but nipples small. No abnormal pigmentation. Thyroid not palpable. Pulse rate 90. C. N. S. examination negative.

Hairy System.—Scalp hair abundant, fine soft brown. Brows exceptionally wide, converge over root of nose. In outer third they are connected with scalp hair by short coarse black hairs. Wide pronounced moustache of medium black hairs, ⅛ to ¼ inch long, filling in whole space between nose and lip. Full beard of typical male distribution, composed of coarse black hair ¼ to ½ inch long. Arc of coarse thick black hair at each corner of mouth, connecting upper lip with chin hair. Between the breasts numerous scattered medium black hairs with male conformation, connected by a few isolated hairs with copious coarse black hairs which form a zone around areolæ fully an inch wide. Abundant short black hair on dorsal surface of arms, extending slightly beyond wrists, fine on upper arms. Luxuriant tangle of long coarse black hair all over lower legs; marked but less striking on thighs, and extending in rich growth down inner dorsum of feet to basal phalanges of the toes. Pubic and perineal hair that of a typical hairy male. Long luxuriant brown-black hair extends from mons veneris up to the navel; beyond the navel less abundant and connecting with the chest hair. Sacrum and buttocks covered with luxuriant long brown-black hair, especially at gluteal folds, within nates and the whole perineal region.

Observation 21. *Pronounced frank homosexual; hirsutism of male type.*

F. N., 26, American, Christian. Wassermann —.

Complaint.—Headaches. Family and past history negative.

Sexual Life.—Menstruation began at 14, regular but scant and painful. Homosexual tendencies manifested at puberty or somewhat before (no psychoanalysis made). Disgust for men. Frank admission of homosexual relationships in which she always assumed the role of a male. Lives life of a libertine. Seductions, etc. Artistic temperament. Ultra-modern tastes in literature, etc.

Physical Status.—Middle height, slender build, has all the appearance of a boy. Olive skin, black eyes, facial erythrosis. Breasts firm, almost flat; nipples small. Thyroid palpable. Manner and body movements clean cut, quick, angular. Voice deep and affected. Pulse rate 90.

Hairy System.—Scalp hair black, abundant. Eyebrows finely pencilled. Few hairs over root of nose. Well defined moustache of fine black hairs. Isolated medium length black hairs on sternum, and on areolæ. Abundant fine short hairs on arms. Abundant coarse black hairs on lower legs. Isolated short black hairs on bases of big toes. Pubic hair typically male, growing an apex which is continued upward by copious fine black hairs to umbilicus and thence to chest.

OBSERVATION 22. *Sterility; hirsutism of male type.*

C. R., 29, Russian Jewess. Wassermann —.

Complaint.—Insomnia, headache, depression, dizziness. Family and past history negative.

Sexual Life.—Menstruation began at 15, always irregular, scanty, painful. Married 8 years. Never pregnant. Told by physician her "husband is weak." Wishes to leave him because of barren marriage.

Physical Status.—Small, slender, fair-skinned woman. Face brightly flushed. Eyes bright, skin dry, peeling. Hair falling out. Breasts well developed. Voice high, thin. Thyroid just palpable. Pulse 100.

Hairy System.—Fine pale lanugo moustache. Few isolated hairs on chin. Fine medium length hair on forearms. Few fine long dark hairs on legs, and basal phalanges of toes. Pubic hair female. No linea alba hair.

III

We have traced a series of clinical pictures in the female, the central point of which is the striving toward maleness, with corresponding reduction or loss of female characteristics. The evolution of the syndrome has been followed from the pseudo-hermaphroditism of the embryonal period to the so-called virilism of adult life. In all the various forms the clinical result has been the formation of sexually intermediate types, the pathological findings binding them together, tumor or hyperplasia of the interrenal tissue.

On the basis of the above 22 observations, the proposition is made that a type of virilism exists which corresponds essentially to the clinical picture of the virilisme surrenal of Gallais; but which is attenuated and compatible with life. In a word, a virilism forme fruste. It is conceded that the observations are limited in number, also that post-mortem support is quite lacking; yet the clinical analogies are too striking and constant to be disregarded. Even though more extended studies show that exceptions are not very infrequent, in the association of male hypertrichosis with genital and psycho-genital abnormalities in the female, the type is not impaired. The pathogenesis of acromegalia and Addison's disease is not doubted because of the occasional exception. How much more

inconstant, then, must be the clinical manifestations of a forme fruste!

The recognition of abnormal hirsutism, associated with genital anomalies, is not new. Frequent mention of it is found in the gynecological literature. The older gynecologists, notably Hegar and Freund, reported cases of abnormal hirsutism of the male type, associated with malformations of the pelvic organs—uterus septus bicoris, uterus unicoris, uterus infantilis, infantile position of the ovaries, hypoplasia of the vagina and external genitalia, etc.—and expressed the conviction that this association was not an accidental one.

The status of the whole problem is still obscure. That the interrenal tissue plays a rôle, probably the most important rôle, in the development of the syndrome, is more than likely. But the remaining endocrine glands cannot be left out of account; notably the pituitary, pineal and ovaries. Though it is idle to speculate, the primary disturbance would seem to lie in the resultant of a balance of power between the cortical tissue and the ovaries. The ovaries, the testes and interrenal tissue are embryologically closely related. They have a common Wolffian origin. It is conceivable that the interrenal tissue has a function closely related to the testes; is, so to speak, a latent testis in the female. The ovaries, on this hypothesis which I propose, would have the function of guarding and conserving the female characters, while at the same time inhibiting the development of male characters. If for any reason, pathological or physiological, temporary or permanent, this balance of power falls to the interrenal tissue, then male characteristics tend to appear. Hirsutism—moustache, and chin hair—not infrequently occurs during pregnancy, to disappear after pregnancy. It is known that during gravidity, in the great majority of cases, follicle growth not only does not take place, but that there is a regression of follicles already growing. The hirsutism of the menopause period is a matter of common comment. During this period, as well as during pregnancy and following castration, an enlargement of the suprarenal cortex takes place.

Granted the existence of virilism forme fruste, it is apparent that an interesting field of inquiry is opened up from a sociological and eugenic point of view; likewise questions that touch upon the "infantile trauma" of Freud in the origin of homosexual traits.

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A MECHANISM PRODUCING HYSTERICAL ABDOMINAL DISTENSION

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The abdominal distension which occurs in hysteria is of interest from its resemblances to the posture of pregnancy and to various pathological conditions in the abdomen.

In the literature of hysteria and in some of the treatises on gynecology, the subject has received attention as hysterical meteorism, hysterical tympanitis, pseudocyesis, phantom tumors, etc.

While the condition appears to be not uncommon, only occasionally has attention been given to the mechanism which produces it, and comment has been made (1) that this explanation is less easy than in some other forms of hysterical gastro-intestinal disturbances. The explanation for its production, usually accepted, is that of Ebstein (2), who found that it may be due to the swallowing of air, which an imperfect closing of the pylorus allows to pass into the intestines, which thereby become distended.

Another mechanical cause for its production, is that of Briquet (3), who ascribed certain cases of abdominal tympanites as being due to an abnormally low position of the diaphragm. Cases of this type he designates "hysterical pseudo-tympanitis." Many instances of this condition occur in those who consciously or unconsciously are influenced by the suggestion of the pregnant state, the result of this being the production of attitudes and symptoms which are sometimes quite confusing in their superficial resemblances to actual pregnancy.

Within recent time we have observed, in the wards of the Psychopathic Hospital, a case of hysteria which gave an excellent opportunity for a detailed study of the mechanisms which are responsible for at least some of the instances of this condition. The patient was a woman, aged twenty-two, who came into the Hospital in January, 1916. At the age of eleven she had an attack of pleurisy, which was followed by chorea minor. From time to time this recurred during the next four years. She was regarded as a nervous child, with an unpleasant disposition, which made it difficult to care for her at home. At the age of eighteen, following the death of her

father, she was sent to a religious institution. There her conduct was so objectionable that she was committed to an insane hospital where she was diagnosed as mentally defective. She was there but a short time, when she was taken back to her family, who had moved to Michigan. At home she was irritable and undisciplined. She was loose in her sexual life and at nineteen developed a salpingitis from a Neisser infection. About this time she claimed to be pregnant, but there is no possibility of this from the account of her family or her physician. A year later the uterus and tubes were removed on account of the salpingitis. Following this she became more irritable and indolent, and told fanciful stories of having been married and that she had a child which was now with an imaginary sister-in-law on the Pacific coast. In December, 1915, she developed otitis media and later had an operation for mastoiditis. In January she was brought into this hospital.

The most striking mental abnormalities were her irritability and her confabulations regarding her experiences. The only neurological disturbance at this time was a slight difference in tactile appreciation between the two sides. After a few days the irritability disappeared and her conduct was quite normal. On the evening of February 19 she complained of abdominal distension. The condition at this time gave her very little concern. The distension was uniform, the wall was tense and gave a tympanitic note. There appeared at this time marked sensory disturbances. The right side was hypalgesic and there was an area of hyperalgesia, extending band-like around the left side of the abdomen, from the seventh dorsal to the first lumbar vertebra. There was a small quadrilateral area of hyperalgesia in the left groin. The conjunctiva was anesthetic and the pharyngeal reflex was absent. Inframammary and inguinal tenderness was marked. The distension gradually disappeared a few hours after static electricity had been applied to the abdomen. Two days later the distension recurred and was accompanied by vomiting. The sensory disturbances were as on the previous occasion.

At about this time she wrote a letter to her mother filled with bitter conplaints against the attitude her family had shown toward her. The following excerpts from the letter are of interest, as bearing on the condition which had developed. In writing about her return home, she continued: "I have got to do something or go and take care of someone's babies, that is the only thing I will love, seeing my life has been spoiled for babies. It was a shame for you to allow Dr. G. to do what he did" (this refers to the hysterectomy which this physician had performed on her). "You had your babies, why couldn't we have children too. It was an injustice to me . . . and so help me God . . . I will do them dirt, the ones you allowed to take that which I loved most in the world away from me. . . . You never thought what it cost me to have all those things taken away, you were only thinking about your own disgrace and never thinking about me. You took what I loved away from me." (She believed that she was pregnant at the time of the hysterectomy.) "If I had gone crazy it would be better than living without a baby.

You let Dr. G. take my baby's life. . . . It would have been as dear to me as E. was to you," (referring to her sister's child) "but of course it was a disgrace for me just because I was not married, but one little life is as precious as another, married or not."

Her interest in reviving these memories of her former personal experiences, and her thoughts on child-bearing, may have been stimulated by her daily association at this time with a fellow patient who was well advanced in pregnancy.

On March 13, 1916, the abdominal distension was again present. On this occasion a series of examinations was undertaken, with the purpose of ascertaining the physiological and anatomical factors

Fig. 1. Normal posture, lying on table.

involved in the distension. In order to show whether or not the distension was due to the presence of air or gas in the stomach or intestine, a belief rather generally held, a tube was passed into the stomach, but no change in the distension occurred. A rectal tube was passed high into the colon, without influencing the condition. The stomach was then distended artificially with air, but this was immediately belched out. After a bismuth meal, Roentgen stereophotographs showed only a normal amount of air in the colon. A fluoroscopic examination showed the diaphragm in its usual position and peristaltic movements went on normally. In order to expel any gas, through contraction of the intestinal walls, one cubic centimeter of pituitrin was injected intra-muscularly. The distension was not changed in any degree.

It thus seems that two of the theories as to the cause of abdominal distension in hysteria could not explain the condition as it

existed in this patient. The abdomen continued distended for several days and the distension gradually passed away on applying the static brush. During the time of distension there was no embarrassment of respiration or change in the rate of rhythm of the heartbeat. The bowels moved normally during this period. There was never any rise in temperature and the blood and urine were normal.

In observing the patient, while lying on the table, when the abdomen was distended, there was always noticed a well-marked lordosis in the lumbar region. The back was elevated about two inches above the surface of the table (Fig. 2). This same lordosis was present as she stood erect. It was never present unless the abdomen was distended (Fig. 1). This association between distension and lordosis suggested that the condition was due to a

Fig. 2. Abdominal distension with lordosis.

posture assumed by the patient, in which the abdominal musculature was primarily concerned.

The determining factors leading to its production were the longing for wish fulfillment and the visual suggestion from the attitude of her fellow pregnant patient. The spontaneous protrusion of the abdominal walls could only occur with an accompanying lordosis. In this attitude, symbolically, her wish was attained. The complex of ideas which related to its production and its continuance became disassociated and the attitude became fixed. As the condition largely concerned the abdominal musculature, visceral functions went on normally.

The explanation of the production thus comes to be a psychological one, quite analogous to what we know occurs in hysterical motor paralysis of other parts of the body.

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CARCINOMA OF THE SPINE.—A CASE OF CAUDA EQUINA DISEASE FOLLOWING THYROID METASTASIS*

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A review of the literature, dealing with neoplasms of the spinal nervous system and the spinal column, reveals the rather interesting fact, that neoplasms of the latter are nearly twice as frequent as those of the spinal cord, nerve roots and peripheral nerves combined. In recent years there has been such a striking diminution in the case reports on the subject of spinal neoplasms that it has been difficult to come to any satisfactory conclusion as to their incidence.

It is a well-established fact that malignant tumors of the spine occur with much greater frequency than benign. Schlesinger[1] gives the ratio of 30 to 1. He found, however, out of a series of 35,000 autopsies at the Allgemeines Frankenhaus, in Vienna, only 59 cases of carcinoma of the spine, and yet within a period of only twenty-one months, he personally had occasion to study 10 cases of vertebral carcinoma. In his comprehensive résumé of the subject, he reports having followed in all, 28 cases. Chiari,[2] in a series of over 2,500 autopsies, found only 3 cases of carcinoma of the spine, a ratio fairly consistent with that of Schlesinger. Williams,[3] out of 75 cases of skeletal carcinoma, found 16 with vertebral involvement.

Carcinoma of the spine, as well as of any other part of the osseous system, is always of metastatic origin. Primary carcinoma of the vertebræ, when spoken of in the older literature, undoubtedly meant that the primary seat had been overlooked. This point was well established, after careful and minute examinations, by Kolisko,[4] of the Pathological Institute of Vienna, who observed that the cases which were formerly considered as primary carcinoma of the vertebræ, were really those of alveola-sarcoma or endothelioma. In order then to correctly diagnose carcinoma of the spine, one would necessarily seek to locate the primary site of the neoplasm. In Schlesinger's collection of 59 cases, the most frequent sites of primary carcinoma which later gave rise to vertebral metastases

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were, in the order of incidence, the mammary glands, the esophagus, the thyroid, uterus, bronchi, stomach, prostate and gallbladder.

The case to be reported is one of adeno-carcinoma of the thyroid, with subsequent metastasis to the lumbar vertebræ, resulting in symptoms referable to cauda equina compression.

Adeno-carcinoma of the thyroid is of relatively infrequent occurrence. Erhardt,[5] reviewing the literature up to 1892, found in all only 150 cases. The osseous system is known to be a site of predilection for this particular form of thyroid metastasis, and where the spine is involved, the lower thoracic and lumbar vertebræ are those most frequently affected; seldom the cervical. Oppenheim,[6] who has given the subject of carcinoma of the spine special consideration, only makes mere mention of a case of thyroid metastasis, reported by Dercum,[7] in 1905. The literature records in all about 17 cases of thyroid metastasis to the spine. Litten,[8] in 1889, Gussenbauer,[9] also Jaeger,[10] 1891, Hollis,[11] 1893, and Middledorpf,[12] in 1894, each reported a case. Schlesinger in 1898 found that of the 59 cases of vertebral carcinoma, the thyroid was the primary seat in 9 instances, but he reported only 2 cases in detail. Von Eiselburg,[13] in 1903, cited 2 of his own cases, and in a casual review of the literature, called particular attention to the rare incidence of this condition.[a] It is also interesting to note that only in this case and in the one reported by Hollis, did the disease occur in the male.

Carcinoma of the spine and the consequent affections of the contiguous nervous structures, although not as infrequent as we are led to believe, has nevertheless received relatively little recognition, when compared, for instance, with Pott's disease or the various other forms of spondylitis. It is the object, therefore, in reporting this case, not only to remark upon the comparatively rare incidence of thyroid metastasis to the spine and to emphasize the interesting features in the clinical course of this case, but also to dwell incidentally upon the rather obscure clinical picture of spinal carcinoma in general. It may be of further interest to call particular attention to a diagnostic aid; one which has not proven successful in the hands of competent observers but which has fully assured us of its worth in this case, namely the X-ray photograph.

Case.—B. K., male, age 52, was admitted to the Montefiore Home and Hospital on December 16, 1915, complaining of pain in both hips, radiating down the legs, so that he was unable to walk for any distance. He was a brass worker, of steady habits, married at 40 to

[a] Since this communication was written, Pfahler, in Surg. Gyn. and Obstet., January, 1917, reported a case of thyroid metastasis to the spine.

a woman of 21, no children nor history of miscarriage; venereal or previous illness denied.

Present illness dated back two years prior to admission, with cutting pains in the left lower limb, commencing above the pelvis, and radiating down the inner side to the ankle. He used various remedies without relief. About six months later, he began to experience similar pains in the right lower limb. He was placed in a plaster-of-Paris jacket for about six months, but was not relieved of his pain, although he stated that his spine, "which was lame, straightened out." The pain, which was very severe, was not constant nor definitely localizable, but mostly in his legs and ankles, never in his feet. While in bed he found comfort only when lying down on either side, and turning over was accompanied by sharp pains in the back of the pelvis. There was no pain upon urination or defecation.

On admission, examination revealed an elderly male, appearing much older than his real age, rather obese and presenting a pasty

FIG. 1. Right lobe of thyroid, containing small, thickly encapsulated tumor.

anemia. He was able to walk slowly and guardedly, with the aid of a cane, but while on his feet appeared to be suffering from pain.

His head and cranial nerves were negative. Examination of the neck did not reveal any thyroid enlargement; no abnormal masses were felt, nor was there any apparent enlargement of the regional lymphatics present. Heart and lungs were negative. His abdomen was protuberant with a heavy paniculus; no tenderness or masses. Genitals negative. Extremities: upper negative; lower, all active movements present and unrestricted. Passive movements of left limb met with some resistance, but there was no tenderness of nerve trunks. The right knee jerk was lively, the left much diminished and occasionally extremely hard to elicit. No Babinski or clonus; no sensory, vasomotor or trophic disturbances.

Examination of the spine did not reveal any deformities, rigidity, tender areas or alteration in consistency.

Blood, urine and serology were all negative.

In the absence of objective organic features, the case was, for

the time being, considered to be probably of a functional nature, and held for further observation.

January 25, 1916. Pains vague and irregular, at times severe and again frequently absent. All difficulty was apparently centered in the region of sacrum, and in impaired locomotion. On standing there was no spinal deformity, but on bending, the lower part of back gave the impression of being flat and rigid. Extremities presented no atrophies and all movements were unhampered. The patient stamped vigorously with both heels, without complaining of pain. Upon rotation of the lower spine, there was intense pain in

FIG. 2. Lumbar spine; thyroid metastasis involving the fourth lumbar, contiguous portions of the third and fifth lumbar vertebræ, encroaching upon spinal canal and cauda equina.

the sacral region, radiating downwards in a general manner along the course of the sciatics, the right more than the left. Heavy percussion over the sacrum, and all rotary movements, involving the lower spine, elicited marked pains. The abdominal and cremasteric reflexes were present and equal; the right knee jerk was lively, the left barely obtainable on reinforcement; both Achilles jerks diminished; no Babinski, ankle clonus, nor sensory disturbances. The prostrate felt enlarged and somewhat harder than normal, but not tender; the outlines were not determined. At this time the

condition was considered to be one of osteitis of the sacro-lumbar spine, and an X-ray examination was advised.

The röntgenologist reported slight evidence of a defect in the outlines of the left border of the body of the fourth lumbar vertebra,

FIG. 3. X-ray photograph showing osteoclastic disease of the left half of the fourth and contiguous portions of the third and fifth lumbar vertebræ.

but added that this was probably an artefact and of no significance.

The patient was given electric-light baths, followed by vibratory massage to the left hip and thigh, three times a week, for two months, and while no special effects were observd, the patient on several

occasions, when questioned, stated that his pains were generally less severe, and that he was, at times, even free from pain.

April 16, 1916. Patient began to suffer from excruciating pains in both hips and lower extremities, and took to his bed. Examined by Dr. I. Strauss, who noted that the left knee jerk was absent, and advised to repeat the X-ray photograph. Pains became more intense, the patient shrieking spasmodically upon slight movements, and not responding well to opiates. He was able to move the left lower extremity to a very slight degree; movements in the right unhampered. Passive flexion and rotation of both thighs, especially the left, produced marked pain.

The röntgenologist, on April 20, 1916, reported bone defect involving the left half of the body of the fourth lumbar vertebra, also small contiguous portions of the third and fifth vertebræ. He now suggested a tumor as the cause.

The patient developed acute retention of urine and feces; abdomen became distended; flexion of thigh upon abdomen produced a large stream of urine (detrussor-paralysis); required very drastic catharsis after failure of enemata, and catheterization, with ready entrance into bladder, resulted in large quantities of urine. The prostrate felt enlarged, but soft and not suggesting malignancy. He began to show evidence of rapid loss of weight, and a peculiar yellowish-brown cachexia. Examination of the spine showed no evidence of deformity or tumor mass. There was extreme tenderness on pressure over the third, fourth and fifth lumbar spines, especially on percussion; also tenderness over both sacroiliac regions, more on the left. The pains continued much the same as described, but with increased intensity. There was some edema and a definite drop foot on the left, but no gross evidence of muscular atrophies, the edema interfering with the determination of the electrical reactions. The left knee and Achilles jerks were absent; no plantar response; the right knee jerk was brisk; Achilles not elicited, but there was a tendency to voluntary dorsal extension of the big toe, with occasional suggestion of Babinski. Sensory examination now revealed anesthesia, analgesia, thermanesthesia with some perversion over the distribution of region from the L 5 to and including the S 5 on the left, the beginning quite sharply defined. There was complete loss of postural sense in the left lower extremity. The right showed no sensory disturbances. The clinical diagnosis now established was malignant disease of the spine, probably secondary to prostate, although the latter did not reveal characteristic feel of malignancy, but rather of a mass behind it. Sacral decubitus developed rapidly, and after a comatose state of about twenty-four hours, the patient died on May 6, 1916.

Pathological Findings.—Autopsy was performed forty hours after death, by Dr. B. S. Kline. The body was that of a well-nourished individual with abundant paniculus; skin of good color.

Both lungs presented evidence of diffuse broncho-pneumonia. None of the thoracic, abdominal or pelvic organs revealed any malignant disease. Just outside of the capsule of the left adrenal

and also imbedded in the surrounding fatty tissue, were two small grape-seed-sized masses, which proved to be accessory adrenals. The prostate was of average size and consistency, with no evidence of disease. The rectum was surrounded by a large pad of fat, in the region adjoining the prostate.

Thyroid: The left lobe appeared somewhat smaller than normal, but of usual consistency and spongy appearance, on section. The right lobe, upper portion was of average size, the lower slightly larger than normal, this being due to a mass, about the size of a hazelnut, the surface of which appeared yellow and opaque. On section, this proved to be a definitely encapsulated tumor mass, having a fleshy, pinkish-gray appearance, and in the neighborhood of which there were a number of smaller, pulpy, whitish nodules. The histo-pathological report was adeno-carcinoma of the thyroid. The regional lymphatics were somewhat pulpy and red, but only slightly enlarged, and showed no tumor metastasis.

Spine: Straight with no evidence of deformity. Upon sawing through, the body of the fourth lumbar vertebra appeared to be almost entirely replaced by a fleshy, pulpy tumor mass, pinkish-gray in color, with deep red areas here and there. The tumor mass involved the lower portion of the third and upper portion of the fifth vertebræ, including the inter-vertebral discs, and was found to encroach upon the spinal canal, although it did not penetrate the meninges. It proved to be thyroid adenoma, replacing atrophic bone, with no evidence of new bone formation.

The third lumbar nerve root, on the left, appeared to have a small subdural hemorrhage, and later presented a number of unstained fibers. The lumbar and sacral segments of the spinal cord, as well as the nerve roots of the cauda equina, were submitted to the Kulschitsky-Weigert and Marchi stains. Very slight changes, not conclusively demonstrable, were noted in a few of the lumbar segments, and consisted of only a mild gray degeneration, of the marginal zones of Lissauer, some portions of the posterior horns and the columns of Goll on both sides. The lumbar and sacral nerve roots, except for an occasional faint trace of fat stain, failed to show definite evidence of myelin degeneration. The posterior root ganglia, ventral roots and the cord tracts, other than those mentioned, remained unaffected.

From the objective features at hand, the clinical diagnosis appears to have been fully justifiable, although not wholly correct. It may, therefore, be of interest to analyze the clinical course, to compare and correlate our findings with those of other observers, who have given the subject of spinal carcinoma careful study.

The primary seat of the neoplasm was not recognized for obvious reasons, but the prostate at one time felt suspiciously enlarged, and although towards the end it did not suggest malignancy, it was considered as the probable primary site of the disease. In view of the later findings, it is justifiable to recall that at the last examina-

tion, as was definitely stated, a mass was felt rather behind the prostate, which proved, at autopsy, to have been a large pad of fat. At no time during the clinical course was there anything to suggest thyroid disease. This conforms with the universal observation, that not only does adeno-carcinoma usually fail to produce any enlargement of the thyroid, but that the growth is generally so small as to be overlooked clinically, the metastasis assuming predominance in the disease picture, and the primary focus found only upon section, or after microscopic examination (Erhardt, Berry,[14] Bruns,[15] Middledorpf, Schlesinger, von Eiselsburg, Wolf[16]). Schlesinger calls particular attention to this, in two cases of cauda equina compression, quite similar to ours, where he failed to recognize the primary lesion in the thyroid, and consequently to arrive at a clinical diagnosis. In Middledorpf's case, attention was directed to the thyroid by sheer accident. Considering that obscure malignant disease of the spine has, in a number of instances, been proven at autopsy to be secondary to the thyroid, it would seem, that after careful examination of other possible sources, this organ should be given some consideration, as the probable site of primary involvement.

Most writers are inclined to view the symptomatology of spinal carcinoma along anatomical lines, namely, first, direct subjective and objective evidence of spinal disease, this being later followed by symptoms of nerve-root irritation or compression and lastly those of cord or cauda involvement. This supposed anatomical sequence of symptoms although natural is but speculative, inasmuch as there is no established uniformity in their appearance, nor are the mechanisms of their production well understood.

One generally finds very little spinal deformity. This is a point of considerable diagnostic significance when compared with other diseases affecting the vertebræ. The contour of the spinous processes is generally very little, if at all altered, even on palpation. Occasionally a lateral displacement of a vertebral body may be discerned on palpation, and if the whole column is affected there may be a sinking in of the diseased vertebræ so that there results considerable shortening of the body length, or the so-called "entassment" of the French. Oppenheim found that a deformity in the nature of a rounded gibbus is sometimes observed, this in contradistinction to the classical angular kyphosis of Pott's disease. Schlesinger found no alteration in the overlying soft parts nor in the consistency of the diseased vertebræ. In most cases rigidity was present in the region of the affected vertebræ, or in the whole spinal column, but there was no pressure tenderness, though sudden movements or

change in posture called forth very severe pain. Even in the rare instances where a visible deformity was present, the spinous processes were scarcely sensitive to pressure (Schlesinger). Bruns cites a case where a whole series of vertebræ were diseased and only one spinous process was tender on pressure. In our case it will be recalled there was at no time any deformity nor alteration in the contour or consistency of the diseased parts. Rigidity of the lumbosacral spine developed only during the last few months of the patient's illness accompanied by local tenderness and pain upon active and passive movements. Towards the last pressure tenderness became very pronounced.

Bone pains localized to the diseased parts are considered by most observers to be present and generally the first manifestation of vertebral carcinoma. They are usually spontaneous, rarely brought about by pressure over the spine except in the late stages, and are often initiated by various trunk movements, so that the patient seeks every position that will prevent shaking of the spinal column. Schlesinger, however, remarks that neoplastic infiltration of bone can occur without pain, and Bruns, Leyden,[17] and Oppenheim found that whereas bone pains are usually the earliest manifestations of actual disease of the vertebræ, they may remain latent for a long period, even years, while root and cord symptoms may be the first evidence of disease. In these instances if there be no other history of cancer the diagnosis is generally overlooked for that of neuritis or myelitis. In the main Petran,[18] and Leuzinger,[19] corroborate this sequence. In our case, the bone pains, if present, were confused with the sciatic-like neuralgias, in other words root pains, which constituted the most prominent symptoms throughout the disease. This Petran has also pointed out, namely, that in vertebral carcinoma it is at times impossible, because of the deep-seated, changeable, and non-localizing character of these pains, to determine whether the latter are of root or bone origin. Moreover in subjects of malignant disease there may be pains in various regions, for which no definite malignant focus is responsible. The dynamic factors in the production of cancer pains, whether they be mechanical or chemical or which predominates in their admixture is still one of the problems for the student of cancer, and particularly so where the osseous system is involved. No satisfactory explanation has been offered for the very early bone pains, although the toxic theory has been favored, particularly by Heinemann,[20] Finkelnburg,[21] Oppenheim, Siefert,[22] and others. Metastasis is known to occur first as a solitary nodule in the central spongious portion of

the vertebral body, and later spreads towards the periphery and particularly the intervertebral foramina. It appears that very often, particularly in metastatic carcinoma of the thyroid, which is usually of an osteoclastic nature, the diseased vertebræ not only fail to increase in size, but become smaller. The explanation offered by Schlesinger, namely, that in the spread of the metastasis, the sensitive periosteum is sooner or later encroached upon, thereby giving rise to pain is perhaps the most plausible. Sternberg[23] found that the bone pains are paroxysmal, remissions in rare instances lasting a year, so that the patients, after being treated as rheumatics, are often considered cured. In the experience of Bruns, Oppenheim and Schlesinger, cases where bone pains were the only symptoms, hysteria was a frequent diagnosis. Oppenheim mentions a case in which, because of the insignificance of signs, a diagnosis of hysteria had been made elsewhere, and within a few weeks there was a complete paraplegia with rapidly fatal issue. In one instance he himself made a diagnosis of hysteria, and the patient improved under psychotherapy, only to develop marked compression myelitis within a few months.

Most important as well as most frequent are the sensory root symptoms which in most cases predominate and are the most dreadful of any disease picture, being typically neuralgic, of great intensity, and long duration. We must take it for granted that in this case the symptoms from the very start began as root pains. For considerably over two years before the final picture of cauda equina disease, the sciatic pains, at first unilateral but later bilateral, with consequent restriction of movement, were the only tangible features of the case. The patient went the rounds of the various clinics and was treated for sciatica, lumbago and admittedly even as a probable functional case.

Careful observers have long maintained that neuralgias of a bilateral sciatic nature were usually indicative of something more than a mere peripheral nerve affection. It was Cruveilhiers,[24] who, in 1835, first called attention to a disease picture, which he termed "paraplegie douloureuse" and which he claimed consisted of an inability to use the lower extremities, because of excruciating pains, but not accompanied by actual paralysis. Charcot,[25] in 1865, spoke of this so-called "paraplegie douloureuse" as being the result of vertebral carcinoma, and in this connection he went so far as to say that double sciaticas were always pathognomonic of carcinoma of the lumbar vertebræ. More recent observers, such as Bruns, lay emphasis upon the fact that in spinal carcinoma the pains are bilat-

eral, and consider this to be in a certain sense characteristic. Schlesinger, although not laying great stress upon the bilaterality, found that, particularly in adeno-carcinoma of the thyroid, a sciatica may, for a long time, be the only sign of beginning metastasis. In two of his cases of thyroid metastasis to the spine, in one case for two and in the other for two and one half years, a sciatica was the only manifestation of disease.

Aside from the sciatic pains and consequent restriction of movement, our patient did not suffer until the last month of his illness. The symptoms of cauda involvement appeared fairly abruptly, after a prolonged course of about two years and four months, a course marked by variable periods of comparative comfort, and even occasional freedom from pain. In justice to the complete study of the case, the writer feels it necessary to call attention to the fact that it was really after resorting to mechano-therapy, in the way of electric-light baths and local massage, that the final, intense stage of cauda equina disease was initiated. Schlesinger, Bruns and others have called particular attention to the fact, that certain cases of spinal carcinoma become manifest after trauma, that the disease process generally remains latent for a long period and then a mild degree of trauma serves to precipitate a rapid destruction of the vertebral bodies. This is what apparently occurred in this case, as evidenced not only by the acute onset of cauda equina symptoms, but by the difference in the extent and intensity of the X-ray shadows, the photographs being taken only two months apart, during which time the mechano-therapy was administered. Irrespective of possible trauma, it is nevertheless the rule that, whereas bone pains and root symptoms are of insidious onset, cord involvement appears very abruptly and generally leads to rapidly fatal issue.

Gowers[26] once remarked that carcinoma of the vertebræ means a matter of only a few months of life. Oppenheim, however, states that, although the course is usually acute and sometimes very rapid, some of the tumors are of slow growth and that the pain and restriction of movement in a certain region may disappear, giving one the impression of a localized cure. In two of his cases there were such marked intervals of freedom from symptoms that he was misled into believing that the condition was benign in nature. Petran found the disease to be characterized by a vacillating course, that the patient may be acutely incapacitated by a heavy onset of pain, then clear up completely. Because of the irregular course and imperfect means of diagnosis, it is well nigh impossible to determine just when metastasis does occur, and, therefore, the duration of the

disease. The duration from the time the primary disease is recognized has been fairly well studied in cases of spinal metastasis from mammary gland carcinoma. Bruns reported a case, where an interval of eight years elapsed between the removal of the mammary carcinoma and the appearance of the vertebral metastasis. Snow[27] cites a case of a woman with two years of symptoms referable to mammary glands, followed by amputation of the latter, then seven years later recurrence of the mammary growth. A month after that, there was a sudden paraplegia from vertebral metastasis. Petran cites instances where as much as eleven years had elapsed, between extirpation of the primary mammary carcinoma and the appearance of symptoms, indicative of vertebral metastasis, and he adds that bone metastasis may remain latent for many years, without giving rise to any symptoms. Adeno-carcinomata of the thyroid are also known to grow slowly and to produce only solitary bone metastases. The clinical course is often a long one, one case of von Eiselsburg lasting for over eight years; the average duration, however, being from two to three years.

The question of the X-ray photograph, in this case, assumes an importance which can hardly be gainsaid. It was admittedly the first clue to the real condition in hand, and the one which led us to a fair understanding of the possibilities and the rational, of subsequent procedures. Unfortunately the X-ray was resorted to, rather late in the study, though the first attempt, from the report of the röntgenologist, was so unsatisfactory, as to be rather misleading. In view of this and the seemingly like attempts in the hands of other observers, it is perhaps questionable whether earlier efforts along this line would have proven to be of any more avail. However, following a period of about two months, during which interval the supposed diseased parts were being exposed to a certain degree trauma, the X-ray photograph then revealed unmistakable evidence of osteoclastic disease of the vertebral bodies, of greater extent than that noted on the previous occasion.

Röntgenological literature has, with few exceptions, failed to give the subject of carcinoma of the spine anything but casual mention. E. Fraenkel,[28] who has been more considerate and who has had occasion to work with malignant diseases of the spine, along these lines, finds that where the X-ray throws a distinct shadow, the growth is usually of a primary nature, and in his experience, either sarcoma, endochondroma, myeloma, etc. We are, therefore, led to believe that secondary neoplasms, such as carcinoma, fail in this respect. Such conclusions might coincide with the pathological characteris-

tics of the various forms of neoplasms, namely, because the primary growths are of an osteoplastic type, while the secondary, particularly adeno-carcinoma, are osteoclastic. Schlesinger states definitely, that unfortunately, in his experience, the procedure of röntgenoscopy has been of no substantial aid in the diagnosis of carcinoma of the vertebræ. In spite of careful examinations, he was unable to make out any real difference in the shadows of the individual vertebræ. Oppenheim speaks of resorting to the X-ray in doubtful cases of spinal neoplasms, but makes mention of successful efforts only where they were of a primary nature, *e. g.*, endochondroma, etc. In the light of the above experiences, and the formidable X-ray findings, in this case, it is very evident that the last word has not been said, with regard to what röntgenoscopy may offer as a diagnostic aid in carcinoma of the spine. This, in view of the tendency to solitary metastases and the long duration of thyroid carcinoma, may have some practical bearing on the management of the disease, and particularly its most distressful manifestations. The very recent reports of the more than palliative results, attributed to röentgen-therapy, notably by Levin,[29] and also Pfahler are very encouraging.

Considering that the symptomatology in this case pointed definitely to an affection of the cauda equina, and added to this the course and duration of the disease, it is of more than passing interest to recall briefly how few, if any, definite structural changes the contiguous nervous tissues presented. It is notably conspicuous fact that the spinal cord proper is practically never a site of carcinomatous invasion. Scanzoni,[30] of the Institute of Chiari, is credited with two cases of supposedly hematogenous metastasis to the spinal cord in general carcinomatosis, and Raymond[31] has reported one instance of invasion of the medulla oblongata. The cauda equina has been cited somewhat more frequently in this connection (Peabody,[32] Edes,[33] Schlesinger, Alexander[34]), while the meninges are quite frequently involved, not only in direct extension but by metastasis (Peabody, Bruns, Buckley,[35] Siefert, Raymond,[36] McCarthy-Myers,[37] Charcot[38]).

The reported anatomical findings in carcinoma of the spine, by Bruns and Nonne,[39] included marked cord changes, and in most instances ascending degeneration of the posterior columns, as in Schlesinger's two cases of cauda equina compression. Not in all instances of myelitis, however, was there post-mortem evidence of contiguous pressure, as in Nonne's case, where there was an acute transverse myelitis with marked cord degeneration. He unhesi-

tatingly attributed the latter to cancer toxemia. The possibility of altered anatomical relations, post mortem, must be considered as illustrated in Darkschewitsch's[40] case of carcinoma of the second, third and fourth lumbar vertebræ, where there was no reasonable post-mortem evidence of direct pressure on the cauda equina, but there was, however, an external hypertrophic pachymeningitis, not carcinomatous, with well-defined ascending posterior column degeneration, up to the medulla. In our case there was sufficient gross evidence of invasion of the spinal canal by the tumor mass, and even a small recent subdural hemorrhage in the left third lumbar nerve root. The other clinically involved nerve structures, however, presented little or no alteration, notwithstanding the clinical course, long duration with profound nerve root irritation and subsequent loss of sensory motor function. It seems, therefore, that whereas the question of neuro-toxemia is not as applicable here as in Nonne's case, yet it cannot be readily dismissed, as the patient was in a profound toxic terminal state.

Conclusions

The study of this case has afforded the writer the opportunity of reviewing the literature pertaining to metastatic disease of the spine, and to draw the following conclusions.

Carcinoma of the spine is of more frequent occurrence than we are led to believe and has received relatively little recognition when compared with Pott's disease, or the various other forms of spondylitis.

Carcinoma of the spine as well as any other part of the osseous system is never primary, but always metastatic. If clinically overlooked, careful post-mortum examination will always reveal the primary site of malignancy. In carcinoma of the thyroid the growth is generally so small as to be overlooked clinically and the metastasis assumes the foreground in the disease picture.

The symptomatology of carcinoma of the spine is varied and obscure, and does not follow any anatomical sequence. Direct objective evidence of disease of the spine is generally absent. Spontaneous bone pains without local tenderness are usually the first manifestations. Most important as well as most frequent are the sensory root symptoms which are of a most intense character.

In adults, persistent sciaticas not responding to the usual therapeutic measures, and particularly when bilateral, should always direct suspicion to disease of the lumbar spine. The so called "paralgie

douloureuse" of Cruvielhiers and Charcot has been accepted as pathognomonic of carcinoma of the spine.

In carcinoma of the spine the disease process generally remains latent for many years. Because of the variable and protracted course, a case of supposed rheumatism, lumbago, sciatica, neuritis or functional spine, is often considered cured, when a mild degree of trauma may serve to precipitate a rapid destruction of the vertebral bodies.

Cord or cauda equina symptoms in this class of cases are generally of very abrupt onset and lead to a rapidly fatal issue.

Roentgenology has up to date offered little substantial aid in the early diagnosis of carcinoma of the spine. This may be due to the fact that carcinoma of bone is osteoclastic, in contradistinction to primary growths such as sarcoma, enchrondroma, etc., which are osteoplastic and where the X-Ray throws a definite shadow.

The degree of structural involvement of the continguous nervous tissues is not always commensurate, with the extent of clinical disease. The spinal cord is practically never a site of carcinomatous invasion. There may be extensive cord degeneration without reasonable post-mortum evidence of direct pressure of the spinal growth and, vice versa as in this case. The question of neurotoxemia must always be considered.

The study of this case is a plea for the more frequent and early recognition of carcinoma of the spine, inasmuch as the course is one of the most dreadful of any disease picture and may be alleviated and possibly controlled by röentgen-therapy.

I am highly indebted to Dr. I. Strauss, attending physician, for the privilege of reporting this case.

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Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

April 3, 1917

The President, Dr. Frederick Tilney, in the Chair

Discussion of Dr. Sharpe's Paper, The Treatment of Paresis by Intraventricular Injections of Salvarsan, Read at the Meeting of March 6, 1917

Dr. G. M. Hammond said that he had had opportunity to examine the thirteen cases treated by Dr. Sharpe by his intraventricular method, as they had all come from either his service at the hospital or his private practice. They were all unmistakably typical of paresis; the histories were gone into in detail and complete examinations made, including all the laboratory tests of the spinal fluid, among them the colloidal gold test. In all but two of the cases this test was beautifully demonstrated. The two cases referred to were both far advanced in the disease; in fact, both had since died in the terminal stage, and yet in neither case was the typical gold reaction obtained.

In regard to the cell count, there was a wide variation between that of the ventricular fluid and the spinal fluid, the ventricular fluid generally containing many more cells.

Personally, the speaker had always been skeptical about all forms of new treatment; he had not known whether this one would be successful or not, but was willing to make the attempt. The improvement of all the cases was the result. In the first place, the operation was perfectly safe, no case having been in bed more than three days and all leaving the hospital on the fifth day. There had been no deaths. As regarded the clinical symptoms, there had been improvement in every one. In five out of thirteen cases a very notable improvement had taken place: to such an extent that they were now self-supporting. Of course many more cases were needed and a longer time must elapse before any positive statement could be made in regard to the final efficacy of the treatment; but, though the colloidal gold test was still positive, these five had gone back to work, could transact business, had better memories, no longer had any ideas of an expansive nature and showed progressive and steadfast improvement which had been maintained for some time. They were all better, and five vastly so. If this method of treatment could improve five out of thirteen cases so that they could return to work, it was better than any other had accomplished. With only one out of one hundred, it would be better than anything done before, especially as the operation was perfectly safe.

In the speaker's experience of many years he had never seen as good results. Whether they were going to be maintained, or sustained, there was no means as yet of knowing, but a few years would show, and meantime

Dr. Sharpe could feel that he had accomplished what had not been done before, and that was something to be congratulated upon.

Dr. J. Wheeler Smith, Jr., spoke of the laboratory work done in the conduct of the series of Dr. Sharpe's cases. This might be considered under two heads: (1) the preparation of the medicated sera and (2) the examination of the patients' blood sera, cerebral and spinal fluids.

A small portion of the serum from the blood, drawn for the preparation of the medicated serum, was put aside each time and was submitted to the complement fixation test for syphilis. Cases 3, 5, 7 and 8 gave negative reactions before intraventricular treatment was begun. The reaction had remained negative in cases 3, 5 and 8. Case 7 showed a positive reaction; this was simply an instance illustrative of the greater delicacy of ice-box fixation. Six cases gave positive blood reactions before treatment and in five of these the test was still just as strongly positive; in the remaining case there appeared to be a diminution in the degree of positivity. Except in the last case, there was no evidence of any effect by this treatment upon the complement fixation reactions of the blood sera in this series of cases.

A specimen of the cerebral fluid was obtained just prior to each intraventricular injection. For various reasons some or all of the examinations were not made of some of the specimens. Some of them were too bloody; some were delayed in transit from the operating room to the laboratory and occasionally a specimen was mislaid or lost.

The globulin tests used were the phenol test of Pandy, the ammonium sulphate tests of Nonne and of Ross-Jones and the butyric acid-sodium hydrate test of Noguchi. The globulin content, both in the cerebral and in the spinal fluids, was definitely diminished by this treatment. The effect of treatment upon the Wassermann reaction was appreciable in two cases. The colloidal gold reaction was a valuable aid in the diagnosis of syphilis of the central nervous system, in particular of paresis. Although a satisfactory theoretical basis for the reaction had not been advanced, the test seemed to be of great practical value. Seven cases all gave typical paretic curves, both with cerebral fluids and with spinal fluids. In two of these a transient effect was produced upon the curves; in five no appreciable change had been wrought in the colloidal gold reactions.

Summarizing, it could be stated that the blood sera, the cerebral fluids and the spinal fluids of eleven cases of paresis undergoing intraventricular treatment with neosalvarsanized or salvarsanized serum were examined at irregular intervals, usually before treatment, after the first treatment, after the second treatment and after the third treatment. Some cases had been examined since, after a lapse of four to eight months. The fluid changes were either nil, or so slight as to be negligible in most instances. The only conclusion possible was that three intraventricular injections of salvarsanized serum were not sufficient to produce fluid changes, though the clinical improvement was marked.

Dr. Sharpe, in closing, said that he wished to say only a few words emphasizing Dr. Hammond's statement in regard to the safety of the treatment: out of thirty-seven injections, no accidents and no deaths had resulted and the only reactions consisted of a rise in temperature and pulse rate for twenty-four hours following the injections in some of the cases. It was, as Dr. Hammond said, too early to claim that any of the cases were cured, but when it was recalled that the five cases, now greatly improved and back at work, had had symptoms of paresis varying from a few months up to two years before treatment, during which time they had been incapacitated for work, and when consideration was given to the condition these paretics would now otherwise have been in if untreated, it was apparent that some-

thing indeed had been accomplished. The speaker felt very much encouraged by the results of the last two years' work in these cases.

CONGENITAL CEREBROCEREBELLAR DIPLEGICS, WITH NOTES UPON THEIR TRAINING-TREATMENT

By L. Pierce Clark, M.D.

Dr. Clark reported three cases of cerebrocerebellar diplegia and spoke of the experience which had been obtained in caring for and training such children. The term cerebrocerebellar diplegia was used for a combination of symptoms dependent upon cerebellar agenesis, or some form of injury to the cerebellum, at the time of or before birth, the exact nature of which had not yet been determined. The varying types of the disorder were those of flaccid and flaccid-spastic palsy, and shaded into the general, mildly spastic state. In the cerebellar ataxic type there was hypotonia, dysmetria, gross incoördination, astasia, abasia, dysarthria, occasionally dysphagia and often complete inability to sit up. In extreme involvement of the forebrain all these cerebellar symptoms were present together with mutism and idiocy. In the mixed types there might be either a slight degree of spasticity in certain parts, combined with hypotonia, or flaccidity in other parts of the body.

It was interesting to speculate what ultimately became of these children affected with congenital cerebrocerebellar palsy. No doubt the children possessing the mildest grades of defect quickly outgrew the disorder. The severest types drifted to special institutions for mental defectives. Prognosis of all the varying types of course depended upon the combination of symptoms presented. When the forebrain was damaged to such an extent that the mental state was no longer to be classed as retardation, but showed mental arrest or marked imbecility, these children usually never recovered either from their ataxia or from their defect in mental development. In the less severe types, one should be quite sure that the mental state was one of simple retardation or mental arrest, as much of the definiteness of prognosis could not be determined until one had made a very decided effort to train out the cerebellar symptoms, or force the forebrain to take up vicariously the functions of the cerebellum.

While the principles of treatment embraced mental as well as motor training, the primary point of approach was to be directed toward overcoming the motor defects. First of all, segmental incoördination was to be removed. The child was to be taught to appreciate, by actual manipulation, the flexion, extension, abduction and adduction of the different segments of the extremities. Frenkel's principles for training trunk incoördinations, laid down for cases of tabetic ataxia, were of the utmost importance. When one had obtained results in removing the segmental defects, there still remained the general motor training for the use of simple, isolated contractions of segments in purposive acts in which all the segments of an extremity were coördinated harmoniously. One might then undertake more definite principles of motor training as laid down in the Montessori, Seguin and other special school systems, where under the guise of play the child was further taught to develop coördination.

In many cases there was ataxia of speech for which training was needed on the same principles as those used for the deaf and dumb. The process of teaching the child the complicated mechanism of speech was often long and tedious. The temperamental defects which invariably went with these cases of congenital cerebrocerebellar diplegia were an important feature to be handled. The disciplinary system of nursery ethics had much to do toward helping the child to develop out of his motor and mental disorder.

The entire training should be carried out for a number of years under the direction of a capable nurse-teacher. The child's disposition should be studied and his interests and ambitions, his physical and mental dislikes taken into consideration. The underlying principle was really to help the child to develop along the lines of his inclination, and to build about the central core of his interest. The results of four years' experience had convinced the speaker that not only might the training system he had employed be of service to this type of cerebellar disorder, but it might serve to encourage a more persistent and careful training of children suffering from cerebral palsies and the simpler types of feeblemindedness where similar cerebellar symptoms of incoördination existed.

Dr. Charles L. Dana said that he felt the Society should thank Dr. Clark for presenting this subject of congenital cerebellar defects, for it deserved more attention than it had heretofore received. He had no criticism nor suggestion to make regarding the training and reëducation of this class of cases, as he considered Dr. Clark's recommendations correct and admirable. The speaker was especially interested in the fact that there were cases of cerebellar diplegia without mental defect and so more typically and truly cerebellar than most of those described by Dr. Clark. He had watched for thirteen years a child, born of neurotic parentage, who at eighteen months was noticed to be different in coördination from other children, and as she grew older her mind developed well but she was discovered to be ataxic, unable even to sit up, and to have other marks of distinct cerebellar defect. She was now a normal child mentally and physically except for the continued existence of an extraordinary defect in locomotion and equilibrium.

H. Voght, in Lewandowsky's Handbook, referred to the large range in the degree to which the cerebellum was involved in congenital cases, but few typical and purely cerebellar cases had been fully described. The speaker had watched a case for twenty-five years in which the cerebellum alone was slightly defective. The patient, a very intelligent person, had never been able to dance or join in active play; she had to balance herself carefully in walking, stood in a cerebellar attitude and had a little tremor of the hands. Conjugate deviation of the eyes was difficult, but she had no nystagmus.

If one were to study carefully the cases of persons regarded perhaps as only naturally very awkward and of poor equilibrium, it might be discovered that mild cerebellar defects were a more frequent feature than supposed heretofore, and by proper methods of education the handicap might be much lessened. So one value of this paper of Dr. Clark's might lie in directing attention somewhat from the subject of cerebral and mental defects to the frequency and importance of cerebellar defects.

Dr. J. Ramsay Hunt expressed his interest in Dr. Clark's presentation, especially from the standpoint of the classification of the cerebral palsies of childhood. He, however, did not think the term "cerebrocerebellar" was a good one, as it was too inclusive and was applied to a group of cases which had already been described as the "atonic-astasic type" (Förster). At the present time there were recognized three types of infantile cerebral palsy: a spastic type, an atonic type and a rare cerebellar type. In addition, there were subdivisions characterized by choreiform movements, athetoid movements, tremiform movements, atactiform movements, epilepsy and mental defect in various degrees and combination. Consequently, if any classification was made of this very large and bizarre group of infantile cerebral affections, one should adhere strictly to clinical subdivisions, at least for the present; and such a term as "cerebrocerebellar" did not tend to clarify the situation, as it would include a group of cases referable to the frontal lobe (Förster type) as well as the cerebellar type. Furthermore, in two of Förster's cases of the atonic type, he had demonstrated the existence of a

lobar sclerosis of the frontal lobes while the cerebellum was macroscopically normal in both the cases; and while in Dr. Clark's cases there were symptoms which suggested a cerebellar origin, it could not be denied that cerebellar symptoms also arose from frontal lobe lesions—which was another objection to the term "cerebrocerebellar."

Dr Hunt desired to call attention to what he would call *the ataxic type of cerebral birth palsy*, which was in marked contrast to the spastic form and the atonic form, although it resembled in many ways the cerebellar type. Three of these cases had come under his observation. This was a type of cerebral birth palsy, characterized by pure ataxia without paralysis or spasticity. There was a history of prolonged or difficult labor, instrumental delivery and injury during the birth, followed by retardation and abnormality in the development of motor coördination. Because of this there was difficulty in learning to sit up, walk, talk and to use the hands. All of these acts showed evidences of incoordination and ataxia, with a tendency toward gradual improvement. There was static and locomotor ataxia and an incoordination of the upper and lower extremities which persisted in the recumbent posture. There was a moderate degree of hypotonicity and the tendon reflexes were diminished and might be difficult to elicit. The superficial sensations were apparently normal and the special senses were not affected. The speech was dysarthric and participated in the ataxic disturbances. There was a moderate degree of retardation of mental development, but no gross intellectual defect and no epilepsy. The symptomatology was bilateral and fairly symmetrical, although the symptoms might predominate on one side. The legs were more affected than the arms. There was a tendency to gradual improvement. The gross motor power was well preserved and there was no tendency to spasticity or exaggeration of the tendon or periosteal reflexes. The plantar reflex was of the physiological type. There was rather a tendency to hypotonicity and diminution of reflex action. There was no nystagmus. Slowing of the rhythmical movements (dysdiadokokinesis) was present. The clinical picture was characterized by motor incoördination which affected in greater or lesser degree the various voluntary movements.

This clinical picture Dr. Hunt ascribed to a meningeal hemorrhage limited to the parietal lobes, *i. e.*, in the sensory sphere of the cerebral cortex. He believed that during the birth there was thrombosis or rupture in those parietal veins of the cerebral cortex which coursed in the interparietal fissure and drained the blood from the parietal lobes. Such a vascular lesion would lie posteriorly to the motor area, in the sensory field, and as a result there would be a disturbance (agenesis or dysgenesis) in the development of the cortical centers and commissural system by which muscle memories were received and transmitted to the motor area.

It was a sensory equivalent of Little's disease, and was characterized by bilateral cortical ataxia; Little's disease was a cerebral diplegia; this was a cerebral diataxia.

Dr. M. Neustaedter asked if there had been any electrical reactions in these cases.

Dr. I. Abrahamson said that he had had two cases similar to those of Dr. Clark, which he had sent to Grossman for reëducation by the Maloney method and improvement in their condition had been reported. He considered this method superior to that of Frenkel.

What Dr. Hunt said was perfectly true and only three years ago the speaker had called attention to the difficulty, in these cases, of differentiating between lesions of the parietal lobes and of the cerebellum; between special orientation and tonus orientation. Some of Dr. Clark's cases showed tremors, festination, etc., pointing to mid-brain disease. Many types could be recognized, depending upon the sites of involvement, and one ought not to speak of a cerebrocerebellar disease, the term being entirely too general.

In closing the discussion, Dr. Clark said that he had used the term congenital cerebrocerebellar diplegia for two reasons: (1) the association palsy was either due to an intrauterine lesion, or one at birth, in which instance the word congenital covered both inborn defect as well as that of an injury at birth, and (2) the cerebrum was probably always affected to some degree, as shown in the fits, the mental defect and the frequent association of injury to the pyramidal tracts, while the type of ataxy present was unmistakably a cerebellar one. As was to be expected in so widespread a lesion, embracing both large structures of the cranium, there were many basal ganglia and mid-brain symptoms in the syndrome, such as tremors, dysarthria, nystagmus and often difficulty in swallowing. It was better to make the syndrome large and all-embracing, for the time being, until there was sufficient clinical material and more was known definitely about the functions of the cerebellar and mid-brain structures; then one might speak of subtypes and specify exactly the structures injured in the different subdivisions of the syndrome.

The really important thing to be emphasized at this time was the detailed general and specific plan of training treatment which had been found so practical and useful in dealing with such children. And not less important was the necessity of extending some such similar training treatment to many other cerebellar disorders, as Dr. Dana had also urged.

Finally, this disorder was by no means so rare as some might think, and we should be on the lookout for cerebellar involvement in all irregular types of cerebral palsies in children.

Dr. Thomas W. Salmon presented a paper with the title: Some New Fields in Neurology and Psychiatry. In the absence of Dr. Salmon the paper was read by Dr. Casamajor (to be published in this JOURNAL).

Dr. Edward D. Fisher declared it was almost impossible to discuss such a vast subject as this, so well treated as it had been by Dr. Salmon. It seemed to him, however, that the opinions therein expressed tallied with his own experience of twenty-five years. In his early days, the principal point often brought up for consideration was the necessity for advance in the understanding by the public and medical profession of mental disease. This had begun before, but the realization of the necessity had culminated in the last twenty-five years, of the proper relationship between ordinary disease and mental disease. Physicians relegated to the care of the insane were often observers without any fundamental knowledge of organic disease and the patients were treated symptomatically. The great advances made in the study of diseases having a bearing on the causation of insanity had had their effect. The treatment of syphilis, the requirements made of physicians in hospitals to study pathology and bacteriology, to acquire some intelligent knowledge of the causation of disease, had done much to place psychiatry on a different basis than previously. The public had been taught to look upon insanity as a disease, capable of improvement, capable of cure and again sometimes incurable, just as some diseases of other organs were incurable or the reverse. This knowledge of insanity by the public and by the courts was being manifested by bringing these cases before an experienced psychiatrist and trying to differentiate the criminal from the insane. Dr. Salmon's paper illustrated this in a most able manner.

Dr. Morris J. Karpas said that of the many important accomplishments that had been successfully undertaken by the National Committee in Mental Hygiene, of which Dr. Salmon was the medical director, the investigations in criminology was certainly one of the most invaluable. The study of criminology along psychiatric lines would certainly greatly advance the knowledge of the causes of abnormal human conduct. The creation of the psychiatric clinics at Sing Sing prison, the Blackwells Island workhouse and penitentiary and the police department of the City of New York spoke for

themselves. It could not be too strongly emphasized that Dr. Salmon was largely responsible for this new interest in social psychiatric problems. His paper was difficult to discuss, for the subject had been covered so exhaustively that there remained nothing new to add.

Dr. I. Strauss considered it hard to discuss this paper, because it was not fair to make any criticisms in the absence of the author, who could not reply to them. But he felt that he must say that it was all very well to comment favorably upon a résumé of the work done in associating psychiatry with criminality, which he believed was a step in the right direction, but he did not believe that segregation, or the study and investigation of criminality, was a solution of the problem of insanity. There was something deeper in the present social system that required investigation. A study of poverty might show it to have something to do with the development of mental disease in the so-called criminal class. The work outlined by Dr. Salmon was an advance in the handling of anti-social problems, but if neurology or psychiatry were to do work that was to count in the future, they would have to tackle problems more fundamental and more significant. It was well to educate the people to believe that insanity was a disease, but it was more important to teach the people that environment in childhood, starvation, unhealthy surroundings, psychically as well as physically, had much to do with the development of abnormal states, and prevention of that kind was more important than segregation of the adult abnormal.

Professor Woodworth, of the department of psychology, Columbia University, said that the part of Dr. Salmon's paper he might comment on was that referring to education; in urging psychiatrists to take an interest in the early development of children or of youth. Education should be controlled by those who understood well the general principles of education as well as the possibility of the development of neurological conditions. It was necessary to make a special study of children and young people, going outside of clinical experience to get at normal conditions in contrast with the early stages of functional diseases. What was needed was not so much retrospective study of children from the standpoint of the adult who had become neurotic, but psychological study of the child as he developed. There should be first hand observation of children from a practical and psychological point of view. There was an opportunity in this field which no doubt many of the members of this Society were utilizing.

Dr. L. Casamajor said that he did not feel competent to express Dr. Salmon's views on the subject and could put forward only his own personal ideas and the thoughts which the paper had aroused in him.

One point in the discussion called for some remark and that was the reference to the "criminal class," and to the "criminal class" developing psychoses. One ideal of society which had worked a great injustice in life was that all men were born equal; society knew that all men were not born equal, for it recognized that men differed in respect to susceptibility to all diseases, but it seemed to have completely neglected the possibility that there might be mental differences and that all individuals were not born mentally equal. There was no such thing as a "criminal class" any more than there was such a thing as a "lawyer class," a "physician class," or a "stenographer class." Crime was a matter purely of the law and so varied in different countries and different times. Business methods which were perfectly respectable ten years ago were now criminal, but that did not place those who indulged in them in a criminal class; probably everyone would belong to the criminal class if this were the case.

The problem of the criminal was one of individual anomalies of character and conduct, and it was the psychiatrist's work to study the causation of these anomalies. In the criminal one beheld an individual who, from

peculiarities of his make-up, or disease of his mind, found himself at variance with the welfare of society and became an anti-social being. He was anti-social because he was defective, or because he was sick, and his crime was but a symptom of his condition. It was not a question of the so-called criminal class becoming insane, but rather one of an individual with a mental defect or a mental disease becoming anti-social to the extent of conflicting with the law—and so a criminal.

PHILADELPHIA NEUROLOGICAL SOCIETY

February 23, 1917

The President, Dr. Williams B. Cadwalader, in the Chair

BILATERAL ANCHYLOSIS OF THE LOWER JAW WITH BILATERAL PARALYSIS OF THE SOFT PALATE AND INVOLVEMENT OF THE LEFT INFERIOR MAXILLARY NERVE

By A. W. Greenwell, M.D.

H. C., a patient in Dr. Spiller's service, aged 22 years, had ankylosis of the lower jaw and pain in the mandibular joints, principally on the left side. The symptoms commenced Thanksgiving, 1915, with earache and deafness on the left side, and subsided in two weeks. Pain developed one week later in the left temporo-mandibular joint. This continued until April, 1916, when excursion of the lower jaw barely permitted entrance of the finger and instruments; at this time a tonsillectomy was done for cryptic tonsils.

X-Ray in September, 1916, showed exudate in the left mandibular joint. The man lost thirty pounds from August to October, 1916.

The jaws were forcibly opened seven times in two weeks in August, 1916, and once under ether the following December. This was followed by pain in the right mandibular joint which has persisted and grown worse. This had occurred before he came to the hospital. He also had two lower also had two lower third molars extracted in this month. This occurred before he came to the hospital.

In January, 1917, he noticed a nasal twang to his voice. He has no hoarseness. He has dull ache in the back and sides of the neck, which changes to sharp shooting pain referred to the sterno-mastoid muscles, when he retracts his head.

Upon opening the mouth, the jaw deviates to the left, and the space is greater between the teeth on the right side. The soft palate is paralyzed bilaterally.

Mucous membrane of mouth is hypersensitive to touch. Vocal cords appear to be normal (Dr. Grayson).

Tactile sensation is lost on the left side of tongue, is normal on the right side.

Taste sensation is lost on the left side of tongue, to salt, sugar and vinegar; is normal on the right side.

Slight wasting is on the right-temporo-mandibular joint and a slight swelling is on the left side.

Anesthesia to touch and pin prick is on the left side of the chin and left side of lower lip, all limited to the distribution of the mental branch of the inferior dental nerve.

Paresthesia is in the area supplied by the left mandibular nerve, consisting of tingling and burning.

There is distinct atrophy and almost total paralysis in the left temporal and masseter muscles and fibrillary tremors in the latter.

X-Ray on February, 1917, showed chronic arthritis in both temporomandibular joints, greater in the left.

X-Ray of cervical spine was negative.

Dr. Charles M. Byrnes said that he hardly felt capable of commenting upon remarks made by Dr. Spiller in explaining the symptoms of this case. There is a possibility, however, that a motor supply to the palatal muscles might be derived from the facial nerve by way of the great superficial petrosal nerve, although the constituent fibers of this nerve have not been definitely defined. Such an explanation would, however, complicate rather than simplify the anatomical conditions in Dr. Spiller's case. It seems that in this case the lesion is limited more or less to the mandibular division of the fifth nerve. The dull, aching, more or less continuous character of the pain with sensory changes suggested to Dr. Byrnes a case he had seen several years ago in which a similar condition had originated from carcinoma of the middle ear and remained confined to this branch for several months, although there was no involvement of the palatal muscles until later in the disease, when other nerves had become implicated.

Dr. Spiller said he was glad Dr. Byrnes had discussed the facial distribution through Meckel's ganglion. He did not think that the facial nerve gives a motor supply to the soft palate. He had never seen a paralysis of the soft palate in facial palsy, although he had looked for it many times. He had seen a deviation of the uvula but a deviation of the uvula may occur in normal persons.

BRACHIAL PLEXUS PALSY WITH AKINESIA AMNESTICA

By N. S. Yawger, M.D.

About a year ago there was admitted into the nervous ward of the University Hospital a patient with the following history: While working in a coal mine in November, 1915, this man sustained a severe injury. At that time his head was caught and strongly flexed to the left while the right upper extremity was forcibly abducted. For about an hour he was held in this position. The patient stated that for the three weeks following there was loss of power and feeling in the right arm. Following this he experienced slight pain in the extremity; however, this was not intense.

Three months after the accident he presented himself at the University Hospital. Examination at that time showed slight wasting of the supra- and infraspinatus muscles; the deltoid, biceps and triceps muscles, also those of the forearm, were softer and showed slight atrophy when compared with the opposite side; the muscles of the hand in particular were wasted.

There was fairly good voluntary power of rotation and abduction in the humerus. Flexion and extension of the forearm was much less forcible than on the left. The biceps and triceps reflexes were absent.

The electrical reactions of the flexor and extensor groups of muscles of the forearm were those of partial degeneration, while the reactions of the muscles in the hand more nearly approximated those of complete degeneration. There was practically no demonstrable sensory change and this in particular, in addition to the electrical findings, which were not of such a serious character, led to the belief that the man had strength in his forearm but that he lacked the ability to innervate the muscles, that is, he had power, but had lost the memory of how to use it. Therefore, he exhibited the state known as akinesia amnestica.

Dr. Spiller directed the patient to make a determined effort to move his hand and this met with just the slightest response. Persistence in these

attempts led in a few days to increased movement. After a few weeks' efforts at reëducation of his muscles, the man left the hospital much improved.

For ten months the patient was lost sight of and then he reappeared at the hospital with his right hand showing considerable atrophy of its small muscles but still with a distinctly useful arm.

Dr. Walter Estell Lee said that the cases of brachial plexus paralysis he had seen during his service at the American Ambulance Hospital in Paris practically all had complete brachial paralysis. He recalled several cases which upon admission had more or less complete brachial paralysis without any sign of injury or wound and others in which there were wounds about the region of the brachial plexus and definite brachial paralysis and in both these types of paralysis the function was eventually fully recovered. It is hardly conceivable that in these types of paralysis there was a division of the nerve fibers. Traumatic injuries of the nerve trunks with crushing and division were quite common. Attempts were made to repair in several instances but the time elapsing since the operation has been too short to hope for any definite results.

Dr. S. Leopold said that sometime previous to seeing this case he saw a case which he thought was one of psycho-neurosis in a young man who showed a supposed musculospiral palsy. There was no history of alcohol in this young man's case. He had been working at a high power dynamo, where the danger from electrical charge was very great, and had been working hard, and one evening he slept there for twenty-four hours and the next day he had what seemed to be a pressure palsy, but it did not clear up as early as it should. There were no signs of reactions of degeneration and the fact that this symptom kept on several months puzzled Dr. Leopold considerably. He found when he asked the man to use the arm that instead of making any movement in the wrist, all the voluntary motion was in the deltoid. Dr. Leopold said he did not know what to call this condition until he read an article by Oppenheim in which he called it akinesia amnestica, or loss of memory for voluntary movement in certain groups of muscles. The patient presented by Dr. Yawger Dr. Leopold also saw and he remembered that his electrical reactions for the flexor group were preserved, and Dr. Leopold was at a loss to diagnose the case until Dr. Spiller brought out the fact that he had simply lost the memory of the voluntary movements. The question arises how to distinguish this picture from the so-called pressure palsy.

Dr. Yawger said the question had not been raised here, but that it had upon other occasions, as to whether such manifestations were not hysterical. Oppenheim has written upon akinesia amnestica and more recently, in the Neurologisches Centralblatt of November 1, 1915, makes use of the term faulty innervation. He there speaks of having observed instances of innervation of one group of muscles when the individual attempts to innervate different groups. Oppenheim protests against these instances of peculiarities of innervation being dismissed as hysterical manifestations.

Dr. Leopold asked whether anyone had studied the voluntary effort of partly paralyzed limbs and had noticed whether the entire group of muscles is brought into play.

Dr. O. R. Diehl presented a case of facio-crural hypoplasia

Dr. A. H. Gerhard presented a family showing four different and unusual nervous disorders.

Dr. S. D. W. Ludlum said he was impressed by these cases as he had been when he saw Dr. Stockwell's guinea pigs, where Dr. Stockwell had in one series fed the fathers alcohol and in the other series the mothers alcohol. These series where the parents had been taking alcohol all showed very

marked nervous symptoms in the offspring. Something had happened in the forebears of these children that made them susceptible in the nervous system.

Dr. Gerhard said as far as he could find out there was no history of alcohol. Two out of the three children had given negative Wassermanns and there was nothing in the history to suggest syphilis. It struck Dr. Gerhard as peculiar that the mother and three children should come to the same hospital with complaints and all of them atypical forms of disease.

Dr. W. Estell Lee read a paper on wounds of the peripheral nerves in modern warfare.

Dr. Charles M. Byrnes said that Dr. Spiller's remarks in regard to the comparative painfulness of the nerves in the upper extremity recalled to his mind a case in which he had injected the radial nerve with alcohol because of continuous spasms of the extensor muscles. Motor paralysis was complete, but the painfulness of the injection was very slight when compared with that associated with the injection of the fifth nerve.

Dr. Alfred Gordon said he had some communication from the other side with some neurologists there who now and then send him a little note in regard to cases of that kind. A book was written on the subject by one of Dr. Dejerine's pupils, Mme. A. Benisty. Following these discussions of war surgery of the nervous system before the Medical Society in Paris, they came to the conclusion that the operation should be performed as promptly as possible, without waiting. That the wound should be opened and the nerve exposed. He recalled a communication by Sicard who reported that complete restoration followed when a very prompt operation was performed. In reference to what Dr. Spiller had said concerning painful median nerve, Dr. Gordon recalled that several months ago in a paper published by Marie he reported a case of injury of the median nerve with marked paresthetic disturbances. The patient suffered unusually intense pain from the injury to that nerve tract. Dr. Gordon said he would like to ask Dr. Lee whether from his experience he could tell us something with regard to the necessity of prompt operations on nerve trunks. Another interesting observation is that of hemiplegia and paraplegia occurring when no direct damage had been done to external tissue of the body. A number of such cases have been reported. A shell exploded at a distance and the patient was knocked down from the great concussion. The opinion expressed at that time by the authors who reported these cases was that the condition occurring in the spinal cord was similar, if not identical with that observed in caisson disease, probably from sudden change of atmospheric pressure.

Dr. A. Bruce Gill said that his interest in the subject of the surgery of peripheral nerves had led to a series of experiments during the last three years, and he thought some recent progress in such surgery would be of interest in this connection

When a nerve is divided the peripheral fibers degenerate, but the proximal fibers degenerate back only a short distance from the site of the injury. Then a multiplication and regeneration of the nerve fibers occur from the proximal end of the nerve. The number of nerve fibers at the point of injury to the nerve becomes greatly increased. The tendency of these fibers is to grow down along the line of the old nerve below the point of injury, but the scar tissue at this point blocks the outgrowth of the nerve fibers and tends to prevent the complete regeneration of the nerve and the return of power to the muscles supplied by it.

The problem in nerve surgery, therefore, seems to be to prevent the formation of scar tissue between the ends of the sutured nerves. Experiments to this end have been partially successful, but are yet far from being complete or in a state to be reported.

Recent work in nerve implantation has shown that a nerve imbedded

in one pole of a muscle from which all the normal nerve supply has been cut will regenerate within the muscle and will innervate not only the pole of the muscle in which it is implanted but the entire muscle. This principle may prove of great practical value in the treatment of infantile paralysis, spastic paralysis, and other conditions.

It has been claimed by certain experimenters also that, if the intermuscular septum is removed between a paralyzed muscle and a normal muscle and the two muscles be sewed together, the paralyzed muscle will be directly innervated by an outgrowth of nerve fibers from the normal muscle.

It seems probable that the motor centers in the spinal cord are capable of supplying, when called upon, an amount of nervous energy in excess of the normal, and that one center might readily supply not only its own normal group of muscles, but other muscles in addition to which it might be connected.

Dr. Lee said in reply to Dr. Spiller's remarks that in the American service at the American Ambulance with which he had been connected no officers were admitted, so that his experience was entirely with the French private. Their cases were allotted to them by the military surgeons at the receiving station and after the special nerve cases had been selected and sent to special French hospitals. So that the nerve injuries reported from the American Ambulance were all complications of other wounds, usually compound fractures.

The question of commotion Dr. Lee felt was always grave when involving the spinal cord. He had seen a number of cases. He recalled three in where there was neither fracture nor wound of the vertebræ and yet there was evidently destruction of the spinal cord, sometimes only hemiplegia and frequently irregular paralyses. It is rather difficult to answer the question whether or not they found complete and permanent degeneration of peripheral nerves from this phenomenon of commotion.

The question of the proper operation for hemorrhage beneath the nerve sheath, incision (longitudinal) of the sheath and evacuation of the blood was probably theoretically correct, but unfortunately their cases rarely arrived early enough to profit by such an operation. It was usually several days after the injury and there was almost always definite destruction of the nerve fibers and practically always infection.

The answer to the question when should a nerve be explored surgically depends always upon the factor of infection. He did not often have the opportunity of early suture of a divided nerve in an open wound. They felt sure, after several unfortunate experiences, that exploration of a nerve for surgical repair should never be attempted until all danger of infection is passed; a minimum of at least two months should be allowed for the natural regeneration of the nerve before surgical interference should be attempted.

In reply to Dr. Lloyd Dr. Lee apologized for not offering more definite results and felt the answer had been given by Dr. Gill. If after three years' experimental work Dr. Gill could not give definite results it certainly was not justifiable after ten months. Dr. Lloyd had referred to the operation of anastomosis as being new. He spoke of the operation of anastomosis because he felt it was the only rational surgical procedure from which one could expect more or less uniform results. He said that it was a common observation that injuries to the median nerve were peculiarly painful.

In reply to Dr. Gordon's statement that complete and immediate restoration of function can occur after immediate suture, Dr. Lee said that this was usually considered impossible. He felt that the consensus of opinion was that immediately following division a degeneration of the peripheral axis cylinder occurs, and that regeneration consists always in a growth of

the proximal axis cylinder down through the empty nerve sheaths until the degenerated peripheral portion is finally replaced.

Dr. Gordon's reference to paraplegias, hemiplegias and irregular paralysis from any injury of the spinal cord was frequently observed. He recalled in all six cases where there had been a history of an exploding shell or a caving in of a trench in which no injury of the soft tissues was found but where hemiplegia, paraplegia and irregular palsies had occurred.

Drs. C. K. Mills, Dr. A. J. Smith and Dr. B. Lucke read a paper on A Recent Visit to Localities of the Winter Epidemics of Poliomyelitis in West Virginia.

Translations

VEGETATIVE NERVOUS SYSTEM

By H. Higier, M.D.

Authorized Translation by Dr. Walter Max Kraus, A.M., M.D., New York

(*Continued from page 557*)

15. Sweat Glands

There remain finally for discussion, disturbances of the activities of the sweat glands, disturbances which often accompany vasomotor abnormalities. The occasional difference between vasomotor and secretory disturbances in diseases of the spinal cord makes it necessary to assume a different localization in and near the lateral horn for the vasomotor and secretory centers. Pharmacological experiments show that substances which stimulate the autonomic system affect both the vasodilator and the sweat gland fibers (hyperemia and hyperidrosis). Physiological and clinical observations show on the other hand that erythema with marked arterial dilatation occurs without increased sweating and that on the other hand marked secretion of sweat occurs in the general or local anemia of such conditions as the death agony, fear, ligature of the artery of an extremity, etc. Clinically speaking, sweating and vasodilatation are not therefore dependent upon each other. Anatomical and pharmacological observations do not agree, for the former places the nerve control of the sweat glands in the sympathetic, the latter in the autonomic.

More exact experiments of recent date point to a double innervation of the sweat glands: from the cervical sympathetic and the bulbar autonomic.

All that has been said above about the tracts concerned in vasomotor disturbances may be transferred to apply to the sweat gland fibers, both in their central and peripheral course. Animal experiments (Winkler, Gribojedow) and observations in man indicate that there are sweat centers in the brain; marked unilateral sweating in motor hemiplegia indicated that the central sweat tract lies close to the motor fibers in the internal capsule and like it decussates (Binger and Burg).

The sweat fibers have their peripheral course like other vegetative fibers, *i. e.*, with the sensory fibers and sweat anomalies are more frequent with sensory disturbances than with motor. Romberg knew that a transplanted nose did not secrete sweat until its sensation had returned (Cassirer).

Charcot placed the sweat centers in the spinal cord beneath the posterior horn near the lateral horn, while Adamkiewicz and Biedl placed them in the lateral group of ganglion cells in the anterior horn. The fibers are supposed to pass by way of the anterior roots to the sympathetic chain. The fibers for the fore-paws of the cat pass by way of the fourth to ninth dorsal nerves, for the hind paws by way of the lower dorsal nerves and the upper four lumbar nerves, for the face by way of the second to seventh cervical nerves (Langley, Nawrocki). The sympathetic fibers to the face pass therefore from the cervical cord centers to the superior cervical ganglion to the carotid plexus and then to the Gasserian ganglion from which they pass with the sensory fibers of the fifth nerve to the skin of the face.

L. Muller believes that the contention that sweat fibers run in the peripheral facial nerve (Köster) must be definitely abandoned. Autonomic sweat centers do exist in the central part of the facial nerve (occasional sweat anomalies in rheumatic paralysis of the nuclear part of the facial). The fibers pass thence by way of ramus communicans albus of the facial and the N. petrosus superficialis major to the sphenopalatine ganglion. From here they pass outward with the fibers of the trigeminus, not with the fibers of the facial.

The fact that there is an autonomic innervation besides the sympathetic is shown by the possibility (Dupuy) of stimulating the sweat glands to activity in animals even after the sympathetic fibers have been cut.

As regards the nervous anomalies of sweat secretion in organic diseases the following may be mentioned: Marked sweating in hemiplegia, which has already been mentioned, hyperidrosis in herpes zoster, anidrosis in those parts paralyzed in anterior poliomyelitis, syringomyelia, multiple sclerosis, myelitis and tumors of the spinal cord. Occasionally in several members of a family there is circumscribed sweating of the face after smelling or chewing certain sharp substances which seems to be a subsidiary reaction. Hemihyperidrosis or hemihydrorrhea is sometimes regarded as a manifestation of mental degeneration. It is accompanied by pupillary and cardiovascular changes. Many authors regard it as a

sympathetic neurosis, others think it a separate and isolated manifestation of defective body development.

In the functional condition "vagotonia" there are localized as well as general attacks of sweating, moist hands and hyperirritability to pilocarpin. The slightest mental excitement, as embarrassment, fear, waiting, will produce sweating in "vagotonics." Just as anxiety brings sweat to the brow, so do severe psychic and physical pains and the specific, sensory, peripheral stimuli (heat and pressure). These latter stimuli are known to be the activators not only of the sweat glands but also the neighboring blood vessels and pilomotor muscles.

Veraguth's psychogalvanic reflex phenomenon shows how very delicate, even more delicate than the pupillary reaction, the reaction of the sweat-apparatus to psychical stimuli really is. The experiment consists in putting the patient in the course of a galvanic current (Veraguth's mirror galvanometer or Einthoven's string galvanometer) and observing the variations in the strength of the current. This electrically obtained curve is an extremely delicate indicator of the more or less complete balance of the emotional condition of an individual. The variations following all varieties of endosomatic events all show the common characteristic of a latent period of several seconds after the event has begun. This implies that the process is rather physiological than purely physical. After these electrical manifestations were shown to be parallel to the reflex, and consistently followed the same psychic stimuli, Veraguth named them the "psychophysical galvanic reflex phenomenon" or more briefly the "psychogalvanic reflex." The greatest reaction to any of the stimuli tried was found to be to a complex whose emotional tone was great, which had the power to evoke the greatest affective response. An example is a patient of Moravcsik's, who, when a number of names of streets were recited to him, showed the greatest reaction when the street on which his sweetheart lived was mentioned. This same author states that there are doubtless individual variations in the latent period. These variations are not only of form, but also of amount. Besides, even though the constancy of the foreign current can be easily controlled, there is a considerable influence exerted upon amount and quality of the deviations of the needle by the condition, surroundings, emotional state, and other exo- and endopsychic factors affecting the person experimented upon. It is therefore wise to establish the average, individual reactibility in each case.

These electrical variations show graphically that a current pass-

ing through the body via the hands shows variations after mental exertion, and after sensory and psychic stimulation. *These variations are in all probability due to changes in the innervation of the sweat-glands of the palm of the hand, or, more particularly, to the changes in moistness of the hands.* The fact that dogs who have no sweat-glands also show the Veraguth reaction must not be forgotten, however. Gregor states that in hysterical, hypnotic and organic anesthesias the reflex is absent.

The finest variations in the mental balance are mirrored by the continually changing resistance of the skin.

16. Pilomotor and Other Smooth Muscles of the Skin

The pilomotor and smooth muscle of the skin, according to anatomical data, receive their innervation mainly from the sympathetic system. Rynbeck's experiments upon cats showed that the hair-raising or pilomotor nerve fibers run in the peripheral sensory nerves and supply corresponding skin areas. The sensory and motor innervation of the skin are both segmental. Fibers from about five sympathetic ganglia run in every spinal nerve.

Various stimuli bring about a contraction of the smooth musculature of the skin. The following are examples: Mechanical: dull and sharp sticking; thermic: pieces of ice and thermophors; electrical: gradually increasing faradic and galvanic currents. Goose flesh, which is due to the activity of the erectores pilorum, and which may best be seen by oblique light, is very readily produced by local application of cold and occasionally by fine long-lasting folding of the skin.

The spontaneous and characteristic feeling as if one's hair stands on end is occasionally accompanied by a feeling of cold. That this is due to vasoconstriction can be shown in areas not having any pilomotor muscles. The stimulus which causes contraction of the pilomotor muscles also causes vasoconstriction, since the anatomical path for both has the same origin and the same topographical destination.

This common path has been demonstrated by Mackenzie in the following experiments. If the skin of a suitable person is vigorously rubbed with a piece of flannel just beneath the nipple one can see goose-flesh appear on the rubbed place and slowly spread upwards to the clavicle and further to the inner aspect of the upper and lower arm. At the same time the patient feels a remarkable sensation of cold passing up the chest and over those aspects of the arm which correspond to the areas with goose-flesh. The basis for this distribution lies in the fact that the rubbing sends stimuli to the

spinal cord centers for the pilomotor and vasoconstrictor nerves. These spread upward. This may be assumed from the fact that the pupil dilates at the same time, and the pupil receives its dilator fibers from the upper thoracic nerves of the spinal cord. In one case of Mackenzie, the patient felt a sensation of cold in the cheek and Sherrington has shown that stimulation of the sympathetic fibers from the third thoracic nerves in monkeys will cause erection of the hair of the cheek. The same author has shown that stimulation of the upper sympathetic in monkeys and cats will cause erection of the hair between the eyes and ears as well as in the occipital region. Langlet in analogous experiments found circumscribed contraction of the hair muscles on the back of the cat, Kahn, on the tail of the marmot, Jegorow, movement of the head-feathers of the turkey.

In human pathology, taking cold water into the stomach is followed by a feeling of cold in the abdomen which is probably due to a constriction of the adjacent skin vessels, and is accompanied by a circumscribed area of "goose-flesh."

The pilomotór reflexes which occur unilaterally in nervous people are worthy of note. They accompany various internal diseases and are limited to a circumscribed area determined by innervation. As an example, direct mechanical stimulation of a branch of the pudendal plexus (prostatitis, cystitis, rectal examination) will produce a circumscribed area of goose-flesh corresponding to some area supplied by the motor part of the lumbar plexus. These nerves to the skin carry, according to Pinkus, the sympathetic nerve-fibers to the erectores pilorum with them, fibers which compose part of the reflex arc. The above-mentioned motor reflex is comparable to the other reflexes of the skin which are brought into play in disturbances of skin innervation. Up to now we have only recognized skin reflexes occurring in disturbances of the sensory, secretory and vasomotor functions. The pilomotor reflex must be added to these. Various stimuli, particularly electrical, applied at certain places, as for example the lateral cervical region (Koenigsfeld and Zierl) and the nape of the neck (Sobotka), will produce, besides the local and long-lasting reaction which manifests itself in a stimulation of the piloerectors, a true secondary reaction of wide extent. This spreads through the spinal cord and the sympathetic ganglia and manifests itself as goose-flesh having a unilateral distribution. When the stimulating electrode is placed under the vertebra which lies at the juncture of the sternocleidomastoid and the trapezius muscles, the stimulation may be said to be applied directly upon the cervical sympathetic.

(*To be continued*)

Periscope

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Abstracted by Dr. J. W. Moore, Beacon, N. Y.

(Vol. 37, No. 1, January, 1915)

1. Hallucinations. P. Schroeder.
2. Weakness of the Plantar Musculature from Bullet-wound of the Nervus Tibialis. F. Kramer.
3. Double-sided, Symmetrical Lesions of Temporal and Parietal Lobes as Cause of Complete Permanent Word-deafness with Preserved Tone Scale, Associated with Tactile and Optic Agnosia. K. Bonhoeffer.
4. Pathological Over-valuation of Ideas and Delusion Formation. K. Birnbaum.

1. *Hallucinations.*—Not all phenomena which are regarded as hallucinations rightfully belong in that classification. Often they are confabulations or persistent dream-impressions. Retrospective falsifications also often play a part. Hallucinations can scarcely be studied separately from the psychotic state of which they are a part. They are not always due to the same causes and mechanisms and no one theory can be laid down concerning them.

2. *Wound of Tibialis.*—Four cases of gunshot wound of the lower leg are described. In all cases, in addition to variable degrees of local injury, there were weakness of the plantar muscles and marked subjective sensory disorder of this region—numbness, paresthesias, pain. These symptoms were often disproportionately severe but usually cleared up.

3. *Double-sided Lesions and Word-deafness.*—A physician of forty-seven years, after several slight attacks of dizziness, suddenly became totally word-deaf and remained so for eighteen months before his death. There was no paralysis and an almost total absence of neurological signs. He was extremely paraphasic, most of his production being unintelligible. He could not write or read, did not appear to understand pictures or objects shown him. When, however, the sense of touch was brought to aid of vision he reacted much better; for instance, when a lighted match was brought towards his face he did nothing until he felt the heat, then he blew it out. He made no attempt to eat when food was placed before him until the utensils were placed in his hands. Complicated actions even with concrete objects were not done well. He made many mistakes in dressing. It was possible to prove that hearing was preserved in both ears and that differences in tone were appreciated. Anatomically there were several lesions found but those which unquestionably produced the symptoms discussed were symmetrical softenings of both parietal and temporal lobes. Inasmuch as the word-deafness had not disappeared, as is usually the case in sensory aphasia, a double lesion had been suspected before death. The important feature in this case is that it was possible to show beyond doubt that hearing for all parts of the tone-scale was preserved. He even recognized voices of relatives as shown by his expression and several times appreciated the meaning of various voice inflections. He could also tell the location of sounds. This, the author believes, is the first case of the sort in which this point has been proven. It

shows that word-deafness is not, as Wernicke held, a loss simply of that part of the tone-scale in which speech is pitched. No mention is made of the work of A. Meyer showing the first transverse temporal gyrus to be the probable receiving station of the auditory tract. In fact this gyrus is not spoken of. The other symptoms in the case were those of agnosia involving the different senses. As destruction in each was only partial and association connections remained, one of the senses was able to assist the other in recognition of objects. There was also some true ideatory apraxia.

4. *Delusion Formation* (a continued article).

(Vol. 37, No. 2, February, 1915)

1. The Question of Cortical Disturbances of Sensibility. O. Marburg.
2. The Subject of Narcolepsy. E. Redlich.
3. Psychiatry and Neurology. K. Bonhoeffer.
4. The Pathogenesis of Sunstroke. C. Römer.
5. Unusual Symptom-complex in a Case of Symptomatic Psychosis. L. Borchardt.
6. Pathological Over-valuation of Ideas and Delusion Formation. K. Birnbaum.

1. *Sensibility and Cortex.*—Three cases of gunshot wound of the left hemisphere resulted in speech disorder, slight weakness of right arm and anesthesia of the thumb, index and sometimes middle finger. The former symptoms cleared up after operation but the anesthesia was permanent. The same area was also thermanalgesic and astereognosic. From the fact that the symptom described occurs so commonly in lesions of the left hemisphere and almost never in lesions of the right leads the author to suggest that it is an agnosia. His conclusion, however, is that a center exists in the posterior central gyrus and neighboring region the loss of which causes anesthesia of thumb, index and middle fingers together with loss of sense of position and location. The distribution bears only a slight resemblance to the anesthesia from a spinal segment lesion. The members involved are those concerned in the most complicated mechanisms including writing and may therefore be specially represented in the cortex.

2. *Narcolepsy.*—A boy of nineteen in excellent physical condition and showing no neurological disorder was subject to attacks of sleepiness three or four times daily. The sleep could not be resisted and no treatment helped the condition. Each sleep lasted ten or fifteen minutes and was followed by slight headache. The author finds most cases of narcolepsy in the literature really belong in another category and that cases like this are extremely rare. The pathogenesis of the condition is admittedly pure conjecture.

3. *Psychiatry and Neurology.*—A reply to Erb's appeal for a complete separation of neurology and psychiatry in teaching as well as practice. Bonhoeffer agrees to the advantage of specializing in one or the other of these subjects but does not think they should be taught separately. Many advantages arise from the association of psychiatry and neurology in the curriculum and the clinic and there is no apparent object to be gained by divorcing them.

4. *Sunstroke.*—Three cases were observed. One terminated fatally and the others recovered. Spinal puncture gave great relief from headache and the pressure and contents of the spinal fluid showed meningeal inflammation with increased serous excretion. A discussion of the various theories of the cause of sunstroke is given and the different effects of the light from different parts of the spectrum as found by Finnsen and others is shown. When the uncovered head is exposed to the sun the rays at the violet end of the spec-

trum which penetrate less but cause more superficial reaction produce redness and edema. If the capillary circulation is altered (dilatation, thrombosis) the waves of greater length at the red end of the spectrum are allowed to penetrate deeply, through the skull and even into the cortex, causing the inflammatory reaction and symptoms of sunstroke.

5. *Symptomatic Psychosis.*—A woman of forty-seven showed euphoria, confusion, absurd megalomania and emotional lability such as are typical of paresis. There were also some disorders of speech and writing and sluggish pupils. The spinal fluid, however, was always normal and the blood and spinal fluid gave negative complement-fixation test for syphilis. Eventually almost complete recovery took place. After much discussion the author concludes that the case was simply a symptomatic psychosis.

6. *Delusion Formation.*—In a long discussion illustrated by several case histories the author shows the development of a delusional psychosis from an over-valuation placed upon some complex or idea which has obtruded itself upon the psychic life of the patient. How an idea can become fixed, gradually exaggerated and eventually occupy the thoughts to the exclusion of all else, while trivial incidents are interpreted to support the idea in a way which to the normal judgment seems absurd, is certainly no new observation, but the author has classified his material into various groups and set the subject forth in a rather interesting manner.

Notes and News

Obituaries

MAX ROTHMANN

The death of Max Rothmann, August 12, 1915, at the age of forty-seven closed a career of exceptional activity. A buyant optimistic energy had carved out many paths of service and added richly to achievement and incentive in the neurological field.

Rothmann was the son of a Berlin physician, Oscar Rothmann. His student days were passed in his native city. He served for three years as assistant to Albert Fränkel and then worked in Hermann Munk's Physiological Institute. In 1899 he qualified for the faculty and in 1911 received the title of professor.

His work, however, was for the most part carried on without the external aid of a university or clinic especially at his service. The free nerve clinic (Charité-Nervenklinik) where he worked under Ziehen and Bonnhoefer, provided him with laboratory facilities for his work in animal experimentation. It was his own ceaseless energy which developed a masterly technique of his own and utilized it through sections and extirpations in extensive and minute investigation which achieved marked success.

The earlier period of his work was devoted to the spinal cord, while later he turned the same skilled attention to work upon the brain. His localization theory was his chief service. He proved that there were at least two other motor tracts beside the pyramidal tract and moreover interestingly showed the difference in the central motor apparatus of man and the other mammals due to the upright position of man. He investigated also the conduction of the individual sensory stimuli. His work in cerebellar localization was very fundamental and of the highest value. Ueber kombinierte Strangerkrankung, "Combined Diseases of the Cord" published in 1895, stood at the beginning of his work in neurology, while his work which appeared in 1914, Die Restitutionsvorgänge bei cerebralen Lähmungen und ihre Beziehung zur Phylogenese, "The Restorative Processes in Cerebral Paralysis and Their Relation to Phylogenesis," was an example of Rothmann's breadth of view and ability to gather an enormous variety of material obtained from

every source of investigation into one comprehensive theory with unity of meaning. He contributed also valuable knowledge in regard to hemiplegia and aphasia.

His greatest achievement in experimental investigation was that which he accomplished through the extirpation of both hemispheres of a dog's brain. He was able to keep the animal for three years during which time he carefully and penetratingly observed all its vital functions. His extensive and profound knowledge of the functions of the central nervous system, like the results of his earlier work, rested not alone on such detailed investigation but also on his noteworthy receptivity of the results of others' researches. He would eagerly receive these and then subject them to testing, and if they were tenable would confirm, perfect and further them. The results obtained by his colleagues in method and in theory owed in large measure their acceptance and application to the problems bound with them to Rothmann's zealous interest.

He never lost sight of the practical side of his studies in their service to medicine. He attempted at once to apply every result attained to the relief of suffering. This was true to his character as a physician, helpful, self-sacrificing, the friend of rich and poor alike. He had developed an active practice and conducted besides a nerve clinic. He devoted himself to the service of the wounded during the earlier months of the war and in the hospitals found opportunity for investigation into the effect of gunshot injury to the nervous system. The death of his son in battle increased his energy of devotion in this service. His strength however began to fail some months before his death occurred.

He was held in high esteem among his fellow members in the Gesellschaft der Deutschen Nervenärtzen, society of German neurologists, of which he was one of the founders. He was fond of debate and claimed attention as an energetic speaker. It was his desire to open an experimental station at Teneriffe for comparative study upon anthropoids. The enterprise was begun but interrupted by the war, therefore now remains as a future opportunity for carrying on the work to which he contributed much and to which he has given lasting incentive.

SMITH ELY JELLIFFE.

GILBERT BALLET

GILBERT BALLET

Gilbert Ballet died in France in March, 1916, at the age of sixty-three, leaving a vacancy in the wide circle in which his personality and scientific achievement had placed him. He had won distinction among the pupils of Charcot, who have established for France a leadership in neuropathology. He was early appointed as head of Charcot's clinic at Salpêtrière. In 1907 he took the chair of history of medicine and two years later recognition was accorded him in his particular field of work, when he was appointed to succeed Joffroy as professor of the clinic of mental pathology and diseases of the brain at the hospice of Sainte-Anne. This post he retained until failing health led to his resignation. He was president of the Congrès des aliénistes et neurologistes française and founder of the Société française de psychiatrie besides a member and president of other societies. He was also a member of the Académie de médecine for the last four years of his life.

His special work in neuropathology began with his investigation of the intracerebro-sensory bundle. His most important published work was his thesis delivered in 1886 on internal speech disorders, Le langage intérieure et les diverses formes de l'aphasie. He published among other works lectures on the psychoses and neuroses which contained valuable clinical matter gathered through his observation, and a treatise on mental pathology to which he had devoted his wide acquisition of knowledge. He was interested in many subjects and though he made no signal new contributions to psychiatrical knowledge his brilliant intelligence, clear-minded and well-balanced spirit of investigation together with his originality in clinical work cleared up much complication and obscurity in neuropathology and psychiatry. His activities included the pathogenesis of Basedow's disease, the polyneuritic psychoses, relations of dipsomania to intermittent melancholia, chronic hallucinatory psychoses, pathologic physiology of hallucinations and systematic dreamlike delusions, and besides he was one of the first with Fournier to assert the syphilitic etiology of general paresis, basing his conclusions on the melancholic attacks preceding this condition. He insisted in his work upon the unity of neurology and psychiatry and exemplified this in his combination of clinical observation, anatomical research and laboratory experiment. His lectures were crowded, attracting by their scientific and esthetic qualities not only physicians and students but those outside the profession.

Ballet distinguished himself in medico-legal affairs by his firm

attitude upon the question of responsibility. He embodied this in a thesis which he succeeded in having adopted in the Congress of French alienists and neurologists held at Geneva in 1908, in which he maintained that responsibility belongs entirely to the department of justice. The medical scientist should merely inform the judge of physical and psychical anomalies and particularly point out their influence upon the criminal act, "*but nothing more.*" The question of semi-responsibility he criticized as a psychic or nosological phantasm for eluding justice.

He was a man simple in manner but full of a personal affability and fascination. His esthetic taste showed itself in literary interest and pursuits. His was a high moral character, absorbed in what was exalted and likewise serviceable to the moral and material betterment of mankind. Notable in this service was the zeal with which he threw himself into the cause of anti-alcoholism.

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OPPORTUNITIES IN NEUROLOGY*

By Frederick Tilney, M.D., Ph.D.

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In taking the chair of this distinguished Society, I wish to express my sincere appreciation of the honor you have seen fit to bestow upon me. The office is at once a responsibility and a privilege. More especially is this so when the quality of the Society's contribution to neurology is taken into account, as well as its present potentialities for the advancement of neurological science. It is customary, I believe, for a newly elected presiding officer in a scientific society to forecast the general trend of the proceedings for the ensuing year and so I would call your attention to what, in my opinion, seem to be some opportunities in neurology.

To one who contemplates recent neurological tendencies it must be apparent that we are passing into a new phase of thought and activity. Many of us who have chosen to consider ourselves neurologists are becoming aware that we are in fact merely clinical neurologists and that other, even greater possibilities lie beyond the border of our immediate domain. The indispensable task of classifying, recording and cataloguing the diseases which befall the human nervous system is now nearly completed. The work stands as a monument to the genius and industry of the past century. One after another the many symptom complexes have been revealed as clinical entities. Their manifestations may now be recognized, al-

* Presidential address read before the New York Neurological Society, February 6, 1917.

though their ultimate explanations are in most instances wanting. And so it has come about, as this realization was borne in upon us, that we are becoming more intent upon the underlying causes and devoting more thought to the mechanism rather than the syndrome. Under the impulse of this newer quest we find our horizon suddenly broadened out. Now, perhaps, as never before we may perceive the actual extent of our problems. We have come to recognize in the nervous system not only a reflector of the many currents of life but a regulator of these currents. Even more we may discern recorded here the sublimation of the adaptive processes of the past; for in this system is preserved a transcription of the momentous changes carried on through age-long periods when, as if cautiously feeling out each possible advantage in the environment, modification succeeded modification, form multiplied upon form, until at length the seeming experiment reached its goal and, so far as we may see, the supreme differentiation was attained. Although it is our especial concern to deal with the problems of this final differentiation we cannot afford to neglect the imprint put upon it by the past. It is not difficult to realize how the nervous system has received an impress from all of these changes if we contrast, for a moment, the conditions of the simple, single-celled protozoön with those of this same general type of animal living as a colony of cells. At a glance a striking, fundamental difference is noted between them. On the one hand the single cell carrying out its cycle of life for and by itself, on the other, a colonized group which because of its relations en masse, has taken a long step in the direction of differentiation. Some of the cells are situated on the periphery and some are near the center —quite a decided difference in the relations to the environment. Their community of interests subserves a common purpose without further complication of structure, but when these interests become highly complex, as in the metazoa, a mechanism which would have control over all of the vital processes and intercellular relations was essential. This mechanism was needed to coördinate the activities of the many cells, so to regulate the time, rate, quality, and quantity of cellular action that the organism might not defeat its end and fall prey to the caprice of its several parts. Called into being by this need of coördination, the nervous system has held an intimate relation to the processes of metabolism. The necessity of understanding the mechanism of this relation is now becoming clearer and its problems more well defined. These are the problems of organic differentiation and the maintenance of such differentiation, of growth and the maintenance of limitations of growth, of

the management and mobilization of the chemical sources of energy —in a word the regulation of metabolism; all of which problems lie within the province of neurology. What part the nervous system plays in primitive embryonic differentiation is still a question. It is certain, however, that much of this differentiation goes on independent of neural control. Muscle tissue, for example, will develop separated from all nerve connection and the fundaments of all the great organ-systems are laid down long before these structures have acquired connections with the nervous system, in fact, during the period when this latter system is still in the formative stage. The influences under which this remarkable grouping and selection of cells from a common germ plasm is made are still unknown. Those who have watched this marvelous process cannot fail to be filled with wonder. They must realize that to explain it as hereditary inertia merely stated the problem and that here as elsewhere there is an underlying mechanism, in part mechanical but more certainly chemical, dependent on zymotic actions or upon the elaboration of other substances intrinsic to the primitive germ layers. While these questions do not interest us directly they have important bearing upon the later phases when discrete endocrinic organs have emerged for the further control of differentiation and growth. Here is a rich field for investigation whose possibilities are just gaining general recognition. Present-day interest in internal secretion demands that every possible source of such secretory activity be explored and its mode of action investigated. It is known that the thyroid is capable of accelerating somatic differentiation but has no power to stimulate growth. This acceleration of differentiation occurs without regard to the standard of size. On the other hand, there is no evidence that the thyroid possesses the power to inhibit growth and when such suppression does occur, due to disturbance in this organ, it is incident to such rapid differentiation that proper growth is prevented. Experimental evidence also shows that the thymus has the power to stimulate somatic growth but lacks the power of producing differentiation.

That the gonads, especially in the male, have much influence upon somatic growth and sex-differentiation, has long been recognized. A number of other structures must now be added to this class, chief among them the cortex of the adrenal. This organ is genetically related to the gonad and in the lower forms remains distinct from that portion prescribed as the medulla of the mammalian adrenal. During the breeding season, in pregnancy and after castration the cortex of the adrenal body enlarges. Disease of it in

females leads to the diminution of certain female sex characteristics and the development of male characteristics. In these conditions there is what has been called an overdevelopment of "maleness," pseudo-hermaphroditism, with the predominance of male characteristics and precocious puberty has been observed in a number of instances. The relation of the pituitary gland to somatic growth and sex-differentiation has, perhaps, received more extensive attention than any other endocrinic organ. But even here there is much room for further investigation, particularly in the relation of this gland to the epiphysis cerebri. Differences of opinion still exist concerning the essential nature of the pineal body. It is regarded by some as an active gland, by others as a vestigium. The question is raised as to whether the nervous system is capable of giving rise to glandular tissue and this at first glance seems like a serious obstacle. Certainly, the nervous system is the most highly differentiated of tissues and the least likely to be pluripotent in its derivatives. Notwithstanding this, however, it may be demonstrated that it is quite possible for glandular structures to develop from the encephalic roof plate and the paraphysis in amphibia may be cited as an example of such glandular formation. There is evidence also from its phylogenetic history that the epiphysis was primarily concerned in glandular development while its relation to the pineal eye is secondary and incidental to a special photoreceptive adaptation. The comparative histology of the pineal body in ophidians, birds and the lower mammals makes it fairly certain that this body is in fact a gland. This view, however, requires further investigation definitely to establish the glandular nature of the epiphysis in man. Upon the decision in this matter will depend our acceptance of the pineal relation to growth and sex-differentiation as well as its reciprocal relations with the pituitary gland. It is entirely possible that the pineal body is another one of the endocrinic glands and that its disturbance during infancy and early childhood leads to the condition first described by Pellizzi as macrogenitosomia præcox. Some suggestive evidence has been advanced by one of the members of this Society, Dr. Timme, that the pineal gland may be concerned in the maintenance of muscular differentiation.

No less important in the endocrinic sphere is the management and mobilization of the chemical sources of energy. The rôle of the thyroid in regulation of protein and fat metabolism and in the mobilization of the carbohydrates is well known, as is also the pancreatic inhibition of sugar mobilization. In part, the general nature of the chromaffin system is understood, especially the medulla

of the adrenalin whose secretory product, adrenalin, is known to facilitate the mobilization of sugar in the body at the same time causing a constriction of all the arteries (except the coronary and pulmonary vessels) with an attendant rise in blood pressure. Whether the infundibular process of the hypophysis, the carotid and coccygeal bodies are to be considered constituents of the chromaffin system is still a question.

Gratifying as may be all of our recent acquisitions of knowledge in the field of the ductless glands, there is yet much to be desired. The mechanism through which these organs operate is hidden in uncertainty. Is their influence upon differentiation and growth made possible through the intermediation of the sympathetic system? Do they act directly upon the central nervous system or is their control an immediate one upon the tissues whose differentiation and growth they regulate? Present indications point strongly in the direction of the sympathetic system as the intermediary in the regulation of metabolism, but until we understand more clearly this particular mode of action we shall not be able to deal efficiently with the practical aspects of the endocrinopathies.

However intimate this apparent supervision of the sympathetic system may be over the biochemical processes, there is a definite neural control which this system exerts over the vegetative life. In essence this control stands in direct physical relation to the processes of alimentation and circulation, respiration and reproduction, secretion and excretion. Into this group also comes the motor apparatus which regulates the amount of light permitted to fall upon the retina. The efficacy of this entire regulation depends upon a delicate muscular balance between mutually antagonistic synergists, the sum total of whose opposing action is necessary to the perfect harmony of function. Much light from the clinical standpoint has of late been shed upon this remarkably balanced mechanism. Although the terminology assigned the two elements in this balance has become somewhat confused, we may speak of the action of the "true sympathetic" as opposed to the "parasympathetic," or, following the German nomenclature, use the terms "autonomic" and "sympathetic proper." That this balance may be profoundly disturbed by certain drugs as well as by certain products of the endocrinic organs has been clearly established. Even more far reaching than the immediate results of the clinical conditions now known as vagotonia and sympathicotonia is the fact that afferent sympathetic fibers provide a pathway by which disturbing impulses from the plane of the visceral and the vegetative life may rise to the fields of conscious-

ness there to become the basis of serious psychic complexes. Or again, by the efferent sympathetic fibers, psychogenic disturbances find an easy path by which to distribute their disorganizing influences to the visceral activities. And so, while the sympathetic system in one capacity holds autonomic sway over the biochemical and physical aspects of the vegetative life, in its equally important phase it serves as the intermediary between this life and the psychic activities. In these respects there is, indeed, an opportunity for the study of mechanisms. There can be little doubt but that in the light of this study manifold complexes, sexual, gastro-enteric, cardio-vascular and respiratory will disclose the secret of their difficulties and we on our part shall make much less frequent use of the convenient carry-all diagnosis, *neurasthenia*.

If there still remain many problems in the splanchnic motor and sensory components, the somatic motor disturbances encountered in clinical experience are becoming more insistent of interpretation upon some broader basis than that of localization alone. There can be no doubt that a more precise understanding of the evolutionary development of somatic motion will reveal much in the disturbances of this mechanism in man.

Two striking features stand out as characteristics of primitive vertebrate motion, the significance of which may not be overestimated; first, its constant rhythmicity and second its automatic association. The reasons for both of these features arise from the necessities of aquatic life. It is essential, for example, that the fish maintain its equilibrium in a fluid medium under the direction of stimuli coming in large part from the vestibular and lateral line organs, hence the constancy of the motions and also their rhythm. These motions, known as the swimming movements, are not confined to individual parts of the body but are manifest in nearly every portion as undulatory oscillations acting in a well-timed association with each other and with automatic precision. The efferent or motor mechanism regulating these movements, although dependent upon the integrative action of many parts is, in all probability, dominated by the paleo-striatum, the most ancient portion of the corpus striatum and one which corresponds to the mammalian globus pallidus. This structure appears to have control over the primitive automatic and associated movements of the lower vertebrates.

With the assumption of terrestrial habitat a far-reaching change is determined. No longer is the constancy or rhythmicity of motion essential; indeed, such motion could scarcely fail to be an actual menace to the animal. Sensory adaptations to the new en-

vironment also became effective further to subjugate the associated and automatic movements to new limitations, at the same time adjusting them to new purposes. These restrictions acting upon primitive motion served to introduce the element of inhibition and also to extend the range in the initiative of motor regulation. In primitive reptiles the neostriatum, corresponding to the caudate and the lenticular nuclei, first makes its appearance. It seems to have introduced the inhibitory influence over automatic, associated movements. The isomorphic character of the globus pallidus in which all of the nerve cells are of the large motor type, and the allomorphic nature of the caudate and lenticular nuclei in which a few large cells are interspersed among a great number of smaller ones, is good evidence in support of this view. During subsequent development the tendency has been to preserve the automatic, associated movements for primitive purposes, yet still more to subjugate them in the interest of wider ranges of motion, and still more again to evolve greater plasticity and independence of movements. Many of these automatic motor acts are easily recognized, such, for instance, as those associating the limb-movements in locomotion, the attitudes and movements in defensive and offensive acts and in other emotive expressions.

It is not alone in the field of phylogeny that this subject opens many possibilities. The evolution of motion may be studied with advantage through human development. There is no difficulty in distinguishing the reflex nature of early fetal movements or the automatic associated movements of infancy, as seen in crying, or the later up-building of complex skilled performances under the control of the will. The relative modernity of the cerebral cortex is indicated by many interesting facts, none, however, more significant than the direct manner in which the pyramidal tract establishes its bulbar and spinal connections. By accommodating itself during its growth downward, now in the dorsal field of one species and again in the lateral field of another, it announces its recent advent among the fibre tracts. Such is not the case with the striatal connections. Here we are dealing with an intersegmental system integrated of many ancient parts whose relations are not fully understood.

The past half dozen years, however, have brought several illuminating pieces of clinical work. In particular should be mentioned the observations of Madame Vogt whose studies show that disease of the putamen and caudate nucleus (neostriatum) causes bilateral athetosis, accompanied by dysphonia, dysphagia, marked muscular spasm, associated movements, rhythmic oscillations with spasmodic laughing and crying attacks but without paralysis. This

she calls pure athetosis and for it proposes the term "Syndrome of the Corpus Striatum." Later Kinnier Wilson made his notable contribution describing the syndrome of progressive lenticular degeneration, a disease of the putamen, which gives rise to tremors of the agitans type—muscle rigidity, tonic and clonic spasms and bulbar symptoms but no paralysis of cortical origin. More recently Ramsay Hunt has described with great care a Syndrome of the Globus Pallidus (paleostriatum). Symptomatically this disease has all of the more prominent clinical features of paralysis agitans. In its juvenile form it is a true system disease and to this form the syndrome specifically refers. In his discussion of corpus striatum Hunt offers what is perhaps the most satisfactory and comprehensive explanation yet given concerning the function of this part of the brain. His distinction of a pallidal system related to the large motor cells, degeneration of which leads to the paralysis agitans complex and a neostriatal system of small cells, inhibitory in function, disease of which in association with hereditary chorea gives us a new interpretation of this important motor mechanism. Athetosis, associated movements, tremor, clonic and tonic spasms, muscular rigidity, spasmodic laughing and crying are some of the motor disturbances which have been attributed to disease of the corpus striatum. These facts in themselves make this part of the nervous system a particularly promising subject for subsequent consideration. In addition to the striatal system there are recent advances in the cerebellar mechanism which require attention, particularly the matter of cerebellar localization. The newer work on muscle-tonus, especially in its relation to the sympathetic system, introduces another point of view which should be investigated. In a word, there is no more fascinating or ultimately profitable field of investigation in neurology today than the study of those mechanisms which contribute to the organization of somatic motion.

No prospectus of neurological thought or endeavor is complete without a word concerning psychoanalysis. Those who have observed the influence of the Freudian theory have seen its adherents go deeply into human experience. What they reveal should not be surprising, yet it has come as a severe shock to many, demonstrating thereby a true defense reaction. This is in a measure due to the fact that we are part of an age which has set its face rigidly against sexuality, thus expressing a prejudice perhaps too stern, perhaps in the best interests of society. However this may be, the psychoanalysts have developed a valuable method with which to search out and release the hidden difficulties of many who would not otherwise receive relief. This is worthy service deserving of recognition.

There is danger, however, in the indiscriminate application of this method both for patient and for physician, for the subject matter is so largely under the ban that misinterpretation is difficult to avoid. Nothing short of frankness and scientific balance will inspire confidence where the opportunities for mysticism are so abundant. The psychoanalysts seem to forget that they use a new language of symbols not altogether easy of comprehension. It is their privilege to be convincing. Whatever of truth they have perceived may be perceived by others, whatever fallacy they hold is matter for fair debate. Many believe that other parts of the body preëmpt cerebral activity, while the gonad is yet little more than a struggling anlage. Desires and repressions arise from impulses other than those directly or indirectly connected with the sexual life. That estrum is a time set aside for sexual purposes is a recognized biological fact. At other times the impulses of animal life are devoted to the direct struggle for existence. When this struggle becomes less direct, when less exacting needs encourage relaxation, new conditions are developed but the primal determinants of behavior still remain. The restriction of psychoanalysis to the sexual sphere would seem to deprive a good method of its fullest application. It may be that there are opportunities for the psychoanalysts in the study of the phylogeny of behavior. In any event, the researches of the animal behaviorists cannot fail to be constructive in our conception of psychic activity.

While we are intent upon the investigation of the mechanisms of the nervous system we should not overlook our clinical obligations. Something of practical value should come from our efforts. The most promising opportunities along this line seem to be in the relation of neurology to social problems, or what Dr. Dana calls preventive neurology. Included in this group are such problems as those pertaining to mental hygiene, to mental defectiveness and delinquency, to prison reform, to industrial regulation guarding against the development of occupation neuroses, to the epidemiology of acute infectious diseases involving the nervous system and other allied subjects having sociological aspects.

Many of the topics here referred to as offering opportunities in neurology are at the present time engaging the interest and efforts of members in this Society. It would seem advantageous in order to encourage and develop the original work already in the process of preparation to conduct our meetings as symposia upon assigned subjects and by thus concentrating our deliberations, render them most valuable.

SOME NEW FIELDS IN NEUROLOGY AND PSYCHIATRY*

By Dr. Thomas W. Salmon

It is not easy to find causes important enough to account for such interest in social problems as that which dominates the thought of the present time. There have been no epoch-making discoveries in ethics or poltical economy—the sciences which we think of most often as those underlying sociology. No new knowledge has been gained in these sciences comparable, for instance, with the great discoveries of Pasteur and Lister, which placed in our hands new and powerful weapons to use against ancient foes and which enabled us to rear the great structure of modern preventive medicine. It has been suggested as one cause that the long struggle for political liberty having succeeded (or at least having carried so many crucial positions that victory is in sight) has disengaged, for the time, the attention of civilized men and enabled them to address themselves to other tasks in the ceaseless effort to better their condition. It has been suggested as another cause that the ills of society have become so grievous that they can no longer be borne and that, in self-defense, the attack against them had to be extended and intensified. It is difficult to believe that evils which have dogged man's footsteps from remote periods have grown to such an extent in the present generation. On the contrary, it would seem more reasonable to expect that, if any change has taken place, these ills have been mitigated by some of the innumerable humanitarian activities which exist today and that, instead of increased interest in the solution of social problems, there would tend to come into existence a feeling of unjustified security as the result of the wider application of palliative measures.

If such explanations seem inadequate, where are we to look for an explanation of the present interest in social problems and more particularly for the source of the efforts being made in many directions to deal with these problems in a constructive and understanding manner? Doubtless many causes are responsible, in large measure or in small, but I would like to speak of one factor that has exerted most profound influence. This is the shining example set by the achievements of preventive medicine. Dr. Osler has said, soberly and earnestly and with no thought of exaggeration: "Measure as we may the progress of the world—intellectually in the growth and spread of education, materially in the application to life of all mechanical appliances, and morally in a higher standard of ethics between nation and nation, and between individuals—there

* Read at meeting of New York Neurological Society, April 3, 1917.

is no one measure which can compare with the decrease of disease and suffering in man, woman and child."[1]

Who can say that "man's redemption of man," as Dr. Osler terms the treatment of disease and the prolongation of human life, has not set new hopes before men's eyes and spurred them on to new enterprises for their betterment and for the betterment of their children? Do we not refer constantly to the achievements of preventive medicine when we wish to renew our own faith in our ability to win victories in new fields of endeavor or to justify new undertakings? The nomenclature of preventive medicine is to be found in many unrelated activities and a very large part of that social work which can best be grouped under the designation "social hygiene" is based in principle, precept and execution upon conceptions similar to those which underlie preventive medicine. There has been formulated the exceedingly useful hypothesis that society, like the individual, has its diseases, that these "social diseases" have their pathology, their external manifestations or symptomatology, in some cases their epidemiology and their specific or general measures of prevention or of control. I do not make use of "social hygiene" in this connection with the restricted application which, unfortunately, is coming into popular use. Much that is comprehended in this narrow conception of social hygiene relates to the control of two infectious diseases; much could more properly be termed "sex physiology," and the rest could accurately be designated "sex hygiene." Social hygiene, in its wider phases, constitutes the strongest link which binds the sciences of medicine to practical work for social betterment. Just as preventive medicine rests chiefly upon pathology and bacteriology but constantly requisitions aid from chemistry, biology, demography and many other sciences, so social hygiene rests chiefly upon ethics and political economy but makes demands upon many others for knowledge. That the projection of some of the conceptions of preventive medicine into the field of sociology has proved useful not only in defining the extent and significance of social problems but in selecting promising points of attack, can readily be shown. It is a rather fascinating task to discover analogies between diseases of the individual and diseases of society and to trace the means by which many diseases (like syphilis and inebriety) can, at the same time, play both parts. The scope of this paper, however, requires attention to other matters.

The new determination to understand social problems in order that they may be dealt with more fundamentally makes insistent demands upon all branches of science to aid in devising means of applying existing knowledge or in pointing the way toward the acquisition of new knowledge. What has psychiatry to offer toward the understanding of social problems or toward the successful accomplishment of work for social betterment? More than a hundred years ago Pinel said: "In mental and nervous diseases I see the key which will unlock the secrets of human nature as they are recorded in history and moral philosophy." Those words have for

[1] Osler, William: Man's Redemption of Man, New York, 1913.

psychiatrists a significance akin to that held for sanitarians in Pasteur's statement that it is within the power of man to free the world from communicable diseases. Pinel saw the wider value of knowledge regarding the human mind but it remained for the belated birth of modern psychiatry to make it possible to devise some practical methods of utilizing this knowledge in dealing with concrete social problems.

We see today psychology contributing to many interests which lie far outside the domain which was ascribed to that science only a few years ago. As William McDougall says in his Social Psychology:[2]

"It is, then, a remarkable fact that psychology, the science which claims to formulate the body of ascertained truths about the constitution and the workings of the mind, and which endeavors to refine and to add to this knowledge, has not been generally and practically recognized as the essential common foundation upon which all the social sciences . . . must be built up. . . .

"A certain number, perhaps the majority, of recent writers on social topics recognize the true position of psychology, but in practice are content to take as their psychological foundations the vague and extremely misleading psychology embodied in common speech, with the addition of a few hasty assumptions about the mind made to suit their particular purposes. There are signs, however, that this regrettable state of affairs is about to pass away, that psychology will before long be accorded in universal practice the position at the base of the social sciences which the more clear-sighted have long seen that it ought to occupy."

McDougall urges psychologists no longer to be content "with the sterile and narrow conception of their science as the science of consciousness" but boldly to assert its claim to be the positive science of mind in all its aspects or as, he prefers to say, "the positive science of conduct or behavior."

W. Trotter in his paper on the sociological application of the herd instinct says:[3]

"When the twenty years just past come to be looked back upon from the distant future, it is probable that their chief claim to interest will be that they saw the birth of the science of abnormal psychology. That science, inconspicuous as has been its development, has already given a few generalizations of the very first rank in wideness of validity and importance of application."

If psychologists see the great practical service which their science can render in dealing with social problems, how much more must it be to psychiatrists who add to the information possessed by the psychologist a grasp of human problems and an intimate knowledge of human personality which their dual capacity as psychologist and physician brings to them. It is very fortunate that the call for assistance in dealing with social problems should come to the psychiatrist at the present time instead of a few years ago.

[2] McDougall, William, Social Psychology, Boston, 1915.

[3] Trotter, W., Sociological Application of the Psychology of Herd Instinct, Sociological Review, Vol. II, 1909.

It is very likely that in the isolation which mental medicine occupied the call would not have been heard. Even if it had reached the psychiatrist he would have found almost insuperable obstacles between his work at that time and active participation in the affairs of community life. The tendency to force all abnormal mental conditions into a heterogeneous group of diseases to which the medico-legal term "insanity" could conveniently be applied, the wide acceptance of the incorrect and "medically useless" conception of mental and physical diseases as distinct and practically unrelated and the hopeless attitude both as to cure and as to prevention which characterized the medical attitude toward mental disease all combined to disassociate mental medicine and its problems from those who are engaging the attention of the psychiatrist's colleagues in general medicine. The isolation in special institutions of patients suffering from mental diseases served also to isolate almost as effectually those who studied these diseases.

Another factor which has deferred wider social applications of psychiatrical knowledge has been the necessity for those who engaged in the study and treatment of mental disease to devote their best energies to the solution of problems of legislation, administration and public care. For centuries the insane and the mentally defective have been excluded from the benefits which have been afforded all other sick persons, and great battles for reforms in public care and supervision had to be fought in our own times by men who entered this branch of medical work. The public care of the insane today, contrasted with that which was tolerated less than half a century ago, testifies to the success of these battles in which the psychiatrist has been engaged and from which his more fortunate colleagues have been spared. While there are still many dark places of neglect into which the light of humanity and science must be brought and while much of the work done on behalf of the insane must be repeated on behalf of the feebleminded, the psychiatrist of today has had his time and energy largely released for things which his predecessors could not have undertaken even if they had possessed the knowledge which is now available.

Now, however, the establishment of psychiatric clinics and of out-patient departments in hospitals for mental diseases, the rapidly extending work of the psychiatrists in the courts and in the schools and the acceptance of psychiatry as an important branch of scientific medicine and of mental hygiene as an important and promising field in hygiene have broken down the barriers which for so long effectually isolated mental medicine.

It does not seem necessary to devote more time to the elaboration of the facts that psychiatry has resources which can be effectively applied to the solution of social problems and that the difficulties which formerly prevented establishing the community contacts so essential no longer exist. I should like to take a few minutes to discuss to what specific social problems are the resources of being most profitably applied at the present time.

Crime

The first excursion made by the psychiatrist into fields entirely apart from the clinical applications of his knowledge was into that ill-defined science termed "criminology." This might have been predicted since those disorders of conduct admitted to be due to mental disease have been so completely turned over to our profession. There seems to be some doubt as to just where the first serious work in this field was undertaken but there is no uncertainty as to the part played by Dr. William Healy in the Juvenile Psychopathic Institute in Chicago. Certainly nothing else has done more toward establishing the usefulness of psychiatry in the courts than the ten years' work carried out by Doctor Healy and the remarkable book in which his results were presented to the public. More from force of this example than for any logical reason, the next clinics to be established for the mental study of delinquents were in children's courts. Then the municipal courts, which deal with adult misdemeanants, established psychiatric clinics and the prisons were the last to provide for this kind of work. Every one here is familiar with the results of mental examinations in children's courts and Doctor Bernard Glueck presented the work of the clinic at Sing Sing Prison in his paper before this Society so clearly and convincingly that no further comment is necessary.

Psychiatric clinics in which delinquents are examined may be divided into two distinct groups, performing quite different functions. The clinic at Sing Sing Prison is the best example of the first group, the chief purpose of which is to assist in dealing with criminals after they have been convicted. Such clinics must be connected with reception prisons and clearing houses of which they constitute the very center. The state of New York is now firmly committed to the plan of establishing a reception prison at Sing Sing and the principle seems so sound that several other states are preparing plans for similar work without even waiting to see how successful that in New York will prove. At Blackwell's Island a psychiatric clinic has been established in connection with the penitentiary and workhouse. To these institutions come every year 15,500 persons convicted of offenses ranging from those of a most trivial nature to those which are as serious from an ethical and legal point of view as the offenses of prisoners committed to state prisons. It is the task of Doctor Raynor who directs this work to look over the enormous number of yearly admissions as carefully as time will permit and to identify the insane, the feeble-minded and those suffering from other psychopathic conditions as early as possible in order that they may be dealt with in accordance with the mental problems which they present. Every one who has any personal knowledge of conditions on Blackwell's Island knows that considerable numbers of insane persons are sent here through the carelessness or ignorance of the courts even though they have not lived criminal lives nor manifested criminal tendencies any more than the majority of patients admitted by ordinary commitment to the civil hospitals for the insane. Doctor Raynor's work

has been too recently inaugurated to make it possible to give any results but it is apparent that, after his work has been under way for a year, a body of facts will be accumulated which will profoundly impress the inferior criminal courts and the prosecuting attorneys.

Such clinics as this and the clinic at Sing Sing are distinctly arms of the prison service. The other type of crime clinic, as these clinics are popularly called, is essentially an arm of the court and here the function of the psychiatrist is to assist the courts in making proper disposition of mental cases before their conviction or sentence. These clinics serve their humanitarian service more successfully than clinics in connection with penal institutions for they can, in many cases, prevent cruel miscarriages of justice and affect the entire after-lives of those who come before them. A little while ago an old man, more than eighty years old, was admitted to the penitentiary at Blackwell's Island charged with vagrancy. He had been suffering from senile deterioration for several years and, by means of an immense amount of patient effort on the part of his family, had been kept at home in the hope that he might be spared the "disgrace of dying in a hospital for the insane." He wandered away from his house and was picked up as a vagrant and sentenced to imprisonment, although he had led a blameless life in the city in which he was born. His mental condition was apparent upon his admission to the penitentiary and as, in the eyes of the law, he was a criminally insane person, he had to be transferred to the Matteawan State Hospital, where he will end his days as an insane criminal. But for their tragic effect upon the lives of human beings, such grotesque miscarriages of justice would be amusing. Notwithstanding the establishment of the clinic, a similar case could be dealt with only by the same means if he were brought to the penitentiary on Blackwell's Island. It would be impossible to send him to any institution except Matteawan until he had served the utterly unwarranted sentence which the judge had imposed. He could be paroled to be sure but, under existing laws, could not be admitted to a civil state hospital while on parole from a penal institution. How different would be the disposition of this case and the hundreds like it were the courts provided with a psychiatric clinic to which any person before them could be sent for a careful mental examination! Except in the Children's Court, however, there has been no anxiety on the part of the courts of New York City to have the services of such clinic. General Sessions, Special Sessions and the Magistrates' Court have been quite content to deal with the disorders of conduct which come before them on the basis of the statutory offences and without regard to the mental factors involved.

Back of the courts are the clinics in connection with penal institutions where the results of judicial carelessness and mistakes can be dealt with only within the limitations imposed by the penal law. In front of the courts a new agency for the psychiatric examination of delinquents has been established in connection with the police department. Through the insight and intelligence of

Commissioner Woods a psychopathic laboratory was established at police headquarters in October, 1915. The purpose of this laboratory was to assist the police in recognizing psychopathic material among the 200,000 individuals who are arrested every year in New York City. The first year's work of this psychopathic laboratory showed the immense field for practical work which existed here but, on account of some internal difficulties, the laboratory was temporarily discontinued. It has just been reëstablished under the direction of Dr. Samuel W. Hamilton. Dr. Hamilton has three full-time assistants, a psychologist and a clinical stenographer. It is obviously impossible for this staff to examine the army of persons which comes into the hands of the police in New York City but an attempt will be made to examine every individual arrested in a district of 502,125 population lying east of the Bowery and south of Fourteenth Street. About 10,000 persons are arrested in this district in one year. As large a number of this group as possible will be examined and all will be at least inspected by the men connected with the laboratory. In addition to these offenders, all those arrested in Greater New York for certain specified crimes—such as arson, sending threatening letters, sex offences, drug addiction—will be examined and magistrates, police officials and others will be encouraged to send to the laboratory all persons coming before them in whom mental disease or defect is suspected. Already this clinic has shown that it can perform a most useful function. A short time ago a young woman called at the office of J. P. Morgan and Company to collect $150,000 which she said was due her father. Her insistence upon seeing Mr. Morgan resulted in her arrest for disorderly conduct. A year ago her entire subsequent career would have depended upon the willingness of the magistrate who first saw her to have her mental condition inquired into. The chance of being sent to the workhouse would have been very much greater than of being committed to Bellevue Hospital for observation. She was brought to the police psychopathic laboratory and a very short examination showed that she suffered from mental disease and had no criminal tendencies whatever. Her relatives were communicated with and when she appeared before the magistrate that officer had the advantage of an excellent report by entirely disinterested psychiatrists and a telegram from her relatives, stating that they would come for her and see that she received proper treatment. The next step in work of this sort is to provide each court dealing with criminal cases and some dealing with civil cases, such as the Court of Domestic Relations, with a competent psychiatrist as an officer of the court. Probably nothing will do more toward showing the necessity for such aid to the criminal courts than the work of the police psychopathic laboratory.

Mental Hygiene

The prevention of mental disease seems now to offer opportunities of sufficient promise to warrant its inclusion in the general advance against disease. The brain, as the organ of the mind,

can be protected against damage resulting from preventable diseases.

It is not quite fair, perhaps, to include the measures of prevention which safeguard mental health in this way in the special field of mental hygiene. The control of such infectious diseases as syphilis will prevent much mental disease. Not less than one fifth of the male admissions to the hospitals for the insane which receive patients from this city are the direct result of syphilis. Nevertheless the prevention of general paresis is not, strictly speaking, mental hygiene. In a much smaller percentage of cases, alcohol seems to be the essential cause of mental disease. We all know that *all* the diseases due to alcohol are preventable by removing the cause and yet the control of the liquor traffic is not within the special field of mental hygiene. Heredity is responsible for a considerable proportion of the seven thousand new cases admitted every year to the New York State hospitals but the control of the heredity factors in disease is the domain of eugenics.

Mental hygiene, it seems to me, deals especially with the *mental causes of mental disease.* Many of these seven thousand new cases seem to be practically independent of such causes as infectious disease, alcoholic poisoning or heredity. Unsatisfactory adjustments to life, the development of unfavorable mental habits and progressive distortions of the personality result in much mental disease and much more mental incapacity of lesser degrees without there being any evidence of the action of external causes or of any demonstrative diseases of the tissues. The histories of such cases—if the whole life of the individual is considered—show many points at which it seems that timely intervention might have determined a happier outcome. With better understanding of the mechanisms of mental life, the hope has arisen that character formation need not always remain a matter of environment and fate. This is the real field of mental hygiene and it is a field in which all work must be actually undertaken by psychiatrists or done under their immediate supervision. Practically all the hopeful points of attack in this field exist in early childhood and if psychiatrists are to take up such work they must be permitted to enter the schools. It is impossible, in the time at my disposal, to do more than indicate the broader outlines of this field. In it the most important work of psychiatry may yet be done.

Education

Whatever other ends may be served by education, its chief object must be the preparation of the individual for successful adaptation to life. If this object is not attained all other results of a so-called education are unimportant. The "educated" man whose life is directed by fixed ideas, prejudices and obsessions is less useful to himself, to his family and to his country than the "uneducated" man who has an open mind, clear insight and a wide range of interests. Those upon whom the duty rests of providing the next generation with the mechanism by which they are to adapt

themselves to life bear a heavy responsibility. Thus far they have concerned themselves with methods of imparting information, the relative practical values of different kinds of knowledge and those individual differences in the ability of their pupils to acquire information which depend upon more or less superficial factors.

It is apparent that the resources of modern psychiatry can be applied with very great advantage in the field of education. The whole affective side of life bears a relationship to education which can be determined only with the assistance of psychiatrists. Already their advice is being sought.

Immigration

The new immigration law which goes into effect on May the first contains the first official recognition of the place of psychiatry in the examination of immigrants. The heavy burden of the support of the alien insane has aroused the authorities of the different states and the presence of psychiatrists at all large ports of entry is now required by law. Already a few psychiatrists in the Public Health Service have developed methods of examination which result in the detection of many cases of insanity and mental deficiency in the face of enormous difficulties. When immigration attains its customary volume after the war it will require the services of not less than forty psychiatrists to carry on the new tasks imposed upon the Public Health Service. These men will have an opportunity of rendering their country a most valuable service and, at the same time, of contributing new knowledge to their department of medicine. More than fifty races are represented in the tide of humanity which flows through Ellis Island. Rich opportunities for research will offer themselves to the psychiatrists who undertake these new duties.

Conclusion

It has been impossible, within the limits of a paper of this character, to do more than to outline, in the briefest way, some of the more striking practical tasks in social hygiene to which the resources of psychiatry are being successfully applied. I think, however, that enough has been said to show that psychiatry has a most important part to play in the great movements for social betterment which we see being undertaken with such high hopes and with such wide popular interest and support. In some of these movements—mental hygiene, provision for the feeble-minded, eugenics, the control of inebriety and the better management of abnormal children—the part of the psychiatrist must be that of leadership not only in research but in the formulation and to a certain extent in the execution of policies. No other science provides so direct an approach to the problems which must be solved before these movements can succeed. In problems such as those of the treatment of criminals and the prevention of crime, prostitution and dependency, the part of the psychiatrist is to lead in research and to contribute information and guidance whenever it appears that mental factors

exercise important influences. It is above all things essential that the psychiatrist should not have the phases of these problems upon which he is to work arbitrarily assigned to him by others. He must obtain a view of the *whole problem* and must make for himself the decision as to which factors are those which can best be understood by psychiatrical study or managed by the methods of dealing with conduct disorders which psychiatry has developed in its long experience with mental diseases and other abnormal states.

These social tasks cannot be evaded by psychiatry. Indeed there seems to be no tendency on the part of psychiatry to evade them, but willingness to aid is not enough. There must be men available—men with sound scientific training, energy, tact and vision. To extend frontiers—whether of a country or a science—frontiersmen are required. Frontiersmen must have idealism, courage and resourcefulness. Without such workers psychiatry will not be able to make valuable contributions in this new field of useful effort. Already, with but the first awakening of popular recognition of the need for psychiatrical aid in dealing with these problems, there are too few workers to meet the demands. Unless, without delay, the medical schools and especially the psychopathic clinics and hospitals undertake to supply the high type of specialized training required, we shall find ourselves in the predicament in which preventive medicine was placed when the demand for workers in hygiene and sanitation far outran the supply of hygienists and sanitarians. The existing official health agencies were nearly stripped of their available men, and there can be no doubt that sanitary progress in this country was seriously impeded by the insufficient supply of workers in the fields which were rapidly opened. The shortage still exists, but public health courses are being formed in the medical schools and there is now a steady flow of young men trained for useful work in this field.

AN ANALYSIS OF FOURTEEN CASES OF SENILE DEMENTIA SHOWING NEITHER ATROPHIC NOR ARTERIO-SCLEROTIC CEREBRAL CHANGES AT AUTOPSY*

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One of the conclusions drawn by Southard from an analysis of the senile material from the Danvers State Hospital was that the diagnosis of senile dementia is too freely used.[1] The diagnosis had been given, it appeared, on insufficient grounds in 14 of the 42 cases specially studied. It will be remembered that all 42 cases had been universally regarded as senile dements by the different diagnosticians at the Danvers daily clinics. To quote conclusion 2 "14 cases which showed neither cerebral atrophy nor cortical arterio-sclerosis (with obvious damage to the cortical tissues) are cases which probably should not have been termed senile dementia, and perhaps more properly belong in a group of senile acute psychoses or other mental diseases, occurring in old age, but not depending on recognizable senile changes."

Southard was able to find a fairly definite group of senile dementias accompanied by brain atrophy (8 in 42). 20 further cases in the series either showed a complication of brain atrophy with arterio-sclerotic cortical damage or else showed such arterio-sclerotic injuries alone, so that Southard felt that the cases were either too complex for the study of morbid entities or were best explained as instances of organic dementia.

The 14 cases without either brain wasting or cortical injury from arterio-sclerosis form a group especially worthy of study. The whole question has considerable bearing on the direction of therapeutics. As has been stated in Southard's report as pathologist to the Massachusetts Board of Insanity "many of these cases are just old persons with relatively intact nervous systems, who have almost the same chance of recovery as persons attacked earlier in life. This fact will secure greater therapeutic attention

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for certain cases hitherto dubbed 'hopeless' dements." And again, "though the majority of the insane of advanced age are hopelessly insane, an important minority has the same chance as have younger cases, shaded a trifle by the capacities of old age itself. It is this minority (perhaps 1 case in 3) which we must learn to differentiate properly in life."

It therefore became important to study more intensively this group of senile non-atrophic, non-arterio-sclerotic cases to see what may be the special pitfalls of diagnosis.

In this study first the clinical records were gone over carefully and the symptoms compared with the symptomatology of senile dementia as outlined by Kraepelin in his Psychiatrie. When there was any doubt about the interpretation of the symptoms, or the period of observation was too brief to allow a decisive judgment, the case was excluded from the group for analysis, since here it was the intention to examine only cases of undoubted senile dementia. The positive cases were then analyzed in detail with regard to the leading symptoms, and the results compared with those obtained by Southard in his examination of cases of senile dementia, the brains of which were found post mortem to be either atrophic or arterio-sclerotic. Then the gross and microscopical findings in the central nervous system were given detailed consideration in order to find whether any other constant changes occurred here that could explain the mental disturbance. And, finally, the autopsy findings in other parts of the body than the nervous system were considered to determine if pathological changes existed here that would explain wholly or in part the mental symptoms. In this way it was hoped that some decision might be reached about what symptoms of senile dementia were due to atrophy and arterio-sclerotic destruction, and what ones were not. And for the symptoms found in non-atrophic and non-arterio-sclerotic brains, some explanation was sought in other changes in the nervous system and in pathological conditions in other parts of the body.

In going over the clinical and autopsy records of the 14 cases, 4 were excluded from the analysis, either because the diagnosis seemed incorrect or because the dementia present was too slight and the symptoms too ill-defined to be safely utilized in drawing conclusions. Case No. 965 showed little dementia and the absence of certain characteristic symptoms, such as restlessness at night, disorientation, and delusions. The memory defect found clinically may have been due to the poor physical condition resulting from

a cancer of the liver found at autopsy. Case No. 1070 gave a history of epilepsy, and during the short stay in the hospital was in a delirious condition closely simulating epileptic delirium in some respects. At least no positive diagnosis can be reached from the clinical data at hand. Case No. 1078 showed little dementia, since disorientation, memory defect, and impressibility defect were absent. The carcinoma of the intestines found post mortem may have been responsible for the so-called hypochondriacal ideas. Case No. 1271 was probably one of senile dementia, with little dementia, but as some important symptoms (disorientation, lack of insight, and marked memory defect) were absent, it was excluded.

The ten cases remaining after the exclusion of these four seem in the clinical pictures to correspond fairly well with the symptoms of senile dementia as outlined in Kraepelin's Psychiatrie. There follows a short abstract of the clinical, autopsy, and microscopical findings in each case:

Autopsy No. 865. J. W. Male, aged 71. Admitted D. S. H., March, 1904. Died April, 1904.

Family History.—No insanity or intemperance in ancestry.

Personal History.—Common school education. Came to U. S. from Ireland at 18. Married at 22. Worked as a laborer and farmer, and remained in one place for 30 years. Was industrious and married life was happy. Used tobacco freely and whiskey moderately. No illnesses of note. For two years before entering hospital had complained of headache and sleeplessness. Became inactive and depressed. Steadily grew more feeble mentally and physically. Memory for recent events was impaired, but was good for remote happenings up to two weeks before admission. Since then has been slightly delirious. Saw people breaking into the house. Thought brother was responsible for his trouble. Heard voices; mumbled to himself.

In Hospital.—Was feeble, restless, and untidy. Conversation was irrelevant. Was completely disoriented. Confused. No evidence of hallucinations. Memory was poor for recent and remote events. Was apprehensive, excitable, and destructive. For four days before death remained in a comatose condition, taking only small quantities of liquid food. Picked feebly at the bedclothes.

Physical Examination, on Admission.—Poorly nourished; emaciated. Chest negative except for signs of a slight bronchitis. Pronounced arcus senilis. Arteries thick and tortuous. Pulse 70 to 100, and irregular. Temp. 98.2. Right bubonocele. Albumin and a few hyaline casts in urine.

Neurological Examination.—Movements feeble and uncertain. Slight opacity of both lenses. Hearing impaired. Arm reflexes prompt. Both knee jerks exaggerated. Achilles and plantar reflexes normal. Pupils dilated, left larger than right. Respond to light. Accommodation not determined. Sensation normal.

Diagnosis.—Senile dementia.

Autopsy by A. M. B.

Pedunculated tumor (nature?) of left arm. Chronic mitral endocarditis. Broncho-pneumonia of right lung. Acute laryngitis. Acute tracheitis. Pneumococcus infection of spleen (?). Slight chronic passive congestion of liver. Chronic interstitial nephritis. Cyst of kidney.

C. e. a. p. Slight chronic leptomeningitis. Arterio-sclerosis of middle cerebral arteries. Brain weight 1,370 grams.

Cause of Death.—Broncho-pneumonia.

Microscopical Findings in the Central Nervous System.—The nerve cells contain a slightly increased amount of pigment. The neuroglia is pigmented especially in the gray matter, and the nuclei are increased in the sub-pial region. A moderate number of satellite cells surround the larger nerve cells. The cortical blood vessels are not thickened but a large amount of pigment is found in the vessel walls. Cord not examined.

Autopsy No. 919. J. G. Male, aged 79. Admitted D. S. H., October 25, 1904. Died October 30, 1904.

Family History.—Negative.

Personal History.—Common school education. Quiet, retiring disposition. Worked on farm until four years before admission. Lame from rheumatism for eight years. Did not use alcohol or tobacco. Began to show signs of failure four years before admission. In August, 1904, became delirious after taking some patent medicine, but quickly recovered. Could not remember what had happened, however. Memory has been failing for two years. A week before coming to the hospital, became suddenly incoherent, delirious, and restless. Did not recognize relatives, or know where he was.

In Hospital.—Was delirious, completely disorientated, and confused. Untidy. Remained in bed. Two days after admission became comatose and died three days later.

Physical Examination on Admission.—Well developed and nourished. Grangrene of right foot. Temperature 99.4. Dullness over both lower backs. Arcus senilis. Arteries thick. Heart enlarged, irregular, and intermittent. Pulse 108. The neurological findings were: Movements feeble and incoördinate. Unable to stand. Hearing and vision about normal. Pupils equal: reaction not determined. Tendon reflexes present in arms. Left knee jerk diminished and right absent. Achilles reflexes absent on both sides. Plantar reflex is normal on the left, absent on the right. Sensation about normal.

Diagnosis.—Senile dementia.

Autopsy 1 hour p. m.

Gangrene of right foot and lower leg. Arterio-sclerosis and partial thrombosis of right anterior and posterior tibial arteries. Arterio-sclerosis of aorta and of coronary and iliac arteries. Chronic interstitial nephritis. Chronic fibrous pleuritis. Chronic splenitis. Sacral decubitus. Obesity.

Chronic external adherent pachymeningitis. Slight chronic leptomeningitis. Slight atrophy of frontal convolutions.

The microscopical examination of the nervous system shows nothing beyond the usual changes of senility. A slight degeneration of the columns of Goll and Burdach is found in Weigert preparations of the cord.

Autopsy No. 927. M. B. Female, aged 72. Admitted D. S. H., November 9, 1904. Died November 20, 1904.

Family History.—Mother died of tuberculosis. One uncle insane.

Personal History.—Early history unknown. Married at 25, and spent 10 years on the sea. Was always well. Three years ago memory began to fail; began to lose her way in familiar streets, and since then there has been a gradual failure more rapid in the last year. Within last year became restless at night. Had hallucinations of hearing. Sometimes is sad and cries, and at other times is very happy. Apprehensive at times. Restless. Constantly repeats phrases such as "Come, let's go home. They won't know where we are." At times does not recognize members of her own family. No history of alcohol or drugs.

In Hospital.—Was very resistive and stubborn. Restless and confused. Talked incoherently. Attention very poor. Disorientated. Jabbered much of the time. Untidy. Took nourishment poorly. Often restless at night. Remained in about the same condition for a week, and then developed a temperature of 100. Died of pneumonia a few days later.

Physical Examination on Admission.—Fairly well nourished. Ecchymosis of skin of face. Systolic murmur transmitted along sternum. Edema of legs. Arteries not thickened. Urine shows trace of albumin and a few hyaline casts. Gait feeble. Tremor of lips and body. Hearing and vision normal. Knee and plantar reflexes normal. Pupils equal, central, regular. React sluggishly to light. Resisted examination.

Diagnosis.—Senile dementia.

Autopsy by A. M. B.

Submaxillary tumor (nature not determined). Broncho-pneumonia (hyperplastic). Chronic fibrous pleuritis. General arteriosclerosis. Acute splenitis. Chronic diffuse nephritis.

Subpial edema. Considerable atrophy of first and second frontal convolutions of both sides. Anomaly of basal vessels. Brain weight 1,240 grams.

Cause of Death.—Broncho-pneumonia.

Microscopical Findings in the Central Nervous System.—In the frontal regions the nerve cells seem to be more sparse than usual, and the glial cells are increased in numbers. Elsewhere the pyramidal cells are normal. In both gray and white matter scattered spider cells are found, and in the superficial stratum the number of glial cells is increased. In the gray matter the neuroglia is pigmented. Pigment is found in the vessel walls in rather large amounts. Cord not examined.

Autopsy No. 998. E. C. Female, aged 73. Admitted D. S. H., August 31, 1904. Died August 29, 1905.

History not obtained. Transferred from Lawrence Almshouse. In almshouse, said they tried to kill her. Speech was incoherent. Communed with angels at night. Was stubborn. At times was bright and happy.

In Hospital.—Was happy and garrulous, talking in a loud voice. Was difficult to examine because of deafness. Said she had been in the hospital six or seven years, and apparently had no idea of place or persons. School knowledge was very deficient. Hallucinations were probably present, but their nature could not be ascertained. Talked of guardian angels around her. Memory could not be tested, but she dwelt on events of early life, thus suggesting a defect for recent events. Had delusions of persecution. Said some people wanted to kill her and steal her clothes, but that they would be damned by the guardian angel which protects her. Had no insight. Was contented and jolly. Talked much in a rambling manner. Was tidy. After a few months became very feeble and was kept in bed. Here was usually quiet until someone approached her, when she would talk volubly. Was observant of things about her on the ward. Slept well. Could recognize doctors and nurses as such. Her temperature rose to 103, and she gradually failed, dying two weeks later.

Physical Examination on Admission.—Very feeble, and hardly able to stand. Poorly developed and nourished. Varicose veins and scars of old varicose ulcers on legs. Arcus senilis. Teeth absent. Lungs emphysematous. Systolic murmur at apex. Pulse very irregular. Arteries hard and tortuous. Abdomen distended and liver dullness decreased. Neurologically, vision was fair; hearing totally gone. Pupils not tested for reaction, but were equal. Arm reflexes normal. Knee jerks diminished (due to poor relaxation). Gait very feeble.

Diagnosis.—Senile dementia.

Autopsy 7 hours p. m. by A. M. B.

Emaciation. Decubitus. Chronic fibrous pleuritis. Chronic fibrous pericarditis (milk patch). Chronic fibrous myocarditis. Chronic fibrous endocarditis, mitral, aortic, mural. Edema and hypostasis of right lung. Broncho-pneumonia and bronchiectasis (local) of left lung. Marked general arterio-sclerosis with calcification. Acute splenitis. Congestion of liver. Retroversion of uterus.

C. e. a. p. Some narrowing of convolutions, frontal, parietal. Consistency of brain decreased. Severe atheroma of larger basal vessels. Brain weight 1,135 grams.

Cause of Death.—Broncho-pneumonia.

Microscopical Findings in the Central Nervous System.—The pyramidal cells are slightly decreased in the frontal region but elsewhere show no abnormal changes. Pigment occurs in the nerve cells in large amounts. The Betz cells are normal. The neuroglia is normal except for a slight pigmentation in the gray matter. The

cerebellum is normal. The smaller blood vessels are not sclerosed but contain pigment in their walls. Cord not examined.

Autopsy No. 1153. W. G. Male, aged 83. Admitted D. S. H., January, 1907. Died March, 1907.

Family History.—Negative (not definite).

Personal History.—Common school education. Was first in express business, and later in small candy and cigar store. For last seventeen years before admission did not work (had leg amputated at that time). Once had typhoid. Before operation was a periodic drinker (8–12 mo.), but has not used liquor since. Onset of mental trouble two years before admission when he began to wander from home and get lost. Before this for two or three years a failure in memory was noticed. Became restless at night and threatening to family. Had delusions of persecution, and was often noisy and excited. Could not remember his own name.

In Hospital.—Was restless and talked loudly. Difficult to examine because of deafness. Was confused and completely disorientated. Answers were not relevant. Hallucinations were present, but their nature could not be definitely ascertained. Memory was probably disturbed for both remote and recent events. Probably had delusions. No insight. Irritable and apprehensive. In bed all the time. Untidy. About a week after admission became stuporous coincident with the appearance of erysipelas on face, and died in this condition.

Physical Examination on Admission.—Fairly well developed but poorly nourished. Arcus senilis. Heart enlarged to left; no murmurs. Arteries hard and tortuous. Pulse 92. Gait was feeble and unsteady. Could not stand in Romberg position. Coarse tremor of hands and tongue. Pupils were regular. Left was pinpoint in size. Both react to light. Knee jerks were normal. Achilles and plantar reflexes could not be obtained.

Diagnosis.—Senile dementia.

Autopsy 46 hours p. m. by E. E. S.

Hypostatic pneumonia. Acute splenitis. General arterio-sclerosis with calcification. Brown atrophy of heart. Slight sclerosis of all heart valves. Chronic fibrous ventricular endocarditis. Chronic splenitis. Chronic appendicular perityphlitis. Chronic atrophic gastritis. Slight hydronephrosis on both sides. Fatty changes of kidneys. Slight pigmentation of the pyramids of the kidneys.

C. e. a. p. (left hemisphere). Edema of brain (p. m. inhibition). Palpable sclerosis of frontal poles, superior frontal gyri, and superior temporal gyri. Atrophy of anterior extremities of both superior temporal gyri. Basal vessels sclerotic. Brain weight 1,425 grams.

Cause of Death.—Pneumonia. Erysipelas.

Microscopical findings in the central nervous system: Pyramidal cells seem to be decreased in the supra-stellate layers in the frontal and temporal areas and more so on the left side than on the right. In other regions cells appear normal except for an increase of pigment. Neuroglia normal. A moderate number of satellite cells

surround the larger nerve cells. In focal areas pigment is found free in the gray matter. The cortical blood vessels are considerably thickened in places, but no occluded vessels are found. The adventitia contains large amounts of pigment. Sections of the cord stained by Weigert's myelin sheath method show a slight posterior column degeneration. Marchi preparations of the cord show nothing.

Autopsy No. 1197. Female, aged 81. Admitted D. S. H., December, 1906. Died September, 1907.

History of past life not obtained. Admitted from almshouse.

Physician's certificate says: Onset gradual several years ago. Temperate. Speech incoherent and inarticulate. Screeches constantly. Destructive. Restless. Violent.

In Hospital.—Usually good natured, but sometimes cross and violent. Very restless. Talked in a loud voice. Completely disorientated. Thought she was in Ireland. Probably no delusions or hallucinations. Marked memory defect for recent events. Could not remember physician from one visit to another. Talked constantly of events of early life. Conversation rambled. Continued in about the same condition until July, 1907, when she broke two ribs. Later became stuporous and confused, and soon died.

Physical Examination on Admission.—Knee joints enlarged. Temperature 99. Heart enlarged. Arteries knotty. Pulse slow and regular. Urine negative. Unable to stand or walk steadily because of feebleness and enlargement of knee joints. Movements are uncertain. Extremely deaf in both ears. Vision dim especially in right eye. Knee jerks absent (due to swelling in knees). Achilles reflexes not obtained because of patient's inability to relax. Plantar reflexes normal. Arm reflexes are sluggish. Right pupil does not react to light and left only slightly.

Diagnosis.—Senile dementia.

Autopsy 12 hours p. m. by R. & A.

Marked emaciation. Contractures of knees. Broncho-pneumonia, right. Chronic mitral endocarditis. Chronic adhesive pleuritis, left. General arterio-sclerosis. Phlebosclerosis. Chronic perisplenitis. Chronic interstitial nephritis. Chronic passive congestion and cirrhosis of the liver (slight). Small cyst of left ovary.

C. e. a. p. (slight; frontal). Chronic leptomeningitis and subpial edema, frontal. Slight granular ependymitis, lateral. Basal and pial vessels thickened. Brain weight 1,190 grams.

Cause of Death.—Broncho-pneumonia.

Microscopical examination of the central nervous system: Nerve cells seem to be slightly decreased in the precentral regions and are markedly decreased in the right temporal gyri. The only change in the neuroglia is a slight pigmentation in the gray matter. In places the blood vessels are somewhat sclerosed, and the walls are pigmented. There is a prominent posterior column degeneration in the cord. The blood vessels of the cord are thickened.

Autopsy No. 1239 S. W. Female, aged 79. Admitted D. S. H., June, 1904. Died March, 1908.

History not obtained.

Physician's certificate says: "Violent. Incoherent. Sometimes stuporous. Sometimes wanders away. Does not sleep well."

In Hospital.—Was excited, apprehensive, and noisy. Somewhat resistive. Soon became more quiet. Could not find her room on the ward. Muttered unintelligibly to herself. Gave incoherent answers to questions. Often cried. Had a good appetite and slept well. Was completely disorientated. Memory was poor for remote and recent events. Could not repeat the alphabet. No hallucinations or delusions. Was irritable. Later became untidy. Mental condition remained about the same until her death.

Physical Examination on Admission.—Well developed and nourished. Facial hirsuties. Anemic. Arcus senilis. Pupils normal. Vision probably somewhat impaired. Hearing markedly impaired in both ears. Knee jerks diminished; plantar reflexes normal. Achilles reflexes absent. Tendon reflexes normal in arms. A general weakness of the muscles with some atrophy was present. Speech thick and indistinct. Gait feeble. Sensation not tested. Heart negative. Vessels thickened. Pulse 72, regular. Urine negative.

Diagnosis.—Senile dementia.

Autopsy 17 hours p. m. by R. & C.

Obese and anemic. Edema of legs. Acute splenitis. Pyelonephritis, left. Chronic fibrous pericarditis. Hypertrophy of heart and brown atrophy of heart muscle. Pulmonic endocarditis and aortic vegetative endocarditis. Chronic adhesive pleuritis and emphysema of lungs. Aortic sclerosis with calcification. Cysts and small tumors of left kidney. Chronic gastritis with dilatation of stomach. Calcified nodule in bladder wall. Fatty liver. Nodule in liver. Erosion of cervix.

C. e. a. p. (general) with calcification. Chronic fibrous diffuse leptomeningitis, sulcal. Slight basal arterio-sclerosis. Slight parietal atrophy, both sides. General cerebral gliosis especially frontal and occipital. Brain weight 1,145 grams.

Cause of death: Heart failure.

Microscopical Examination of the Nervous System.—No degenerative changes occur in the nerve cells. The neuroglia shows proliferative changes everywhere, and there is an increase in the cells in the gray matter. There are a moderate number of satellite cells. Blood vessels are not unusual. The posterior columns of the cord show a slight degeneration by the Weigert method. The anterior horn cells contain very large amounts of pigment.

Autopsy No 1263. S. O. Female, aged 75. Admitted D. S. H., May, 1906. Died August, 1908.

Family History.—Not obtained.

Personal History.—Education poor. Habits good. Disposition willful and proud. Health always good until onset of mental trouble four years before admission. First a memory defect and irritability appeared. Became restless and unreasonable. Had fleeting auditory and visual hallucinations. Became apprehensive and thought someone was around the house at night trying to enter. Got the idea that certain neighbors owed her money and demanded it from them. Always temperate.

In Hospital.—Was quiet and satisfied but apprehensive. Was completely disorientated. No hallucinations. Memory defective for recent and fair for remote occurrences. Statements were disconnected. At times suspicious of those about her. No delusions. Generally pleasant but easily irritated. Impressibility very poor. Some insight. Tidy. No important changes in her condition occurred.

Physical Examination on Admission.—Well developed and nourished. Arcus senilis. Systolic murmur at apex of heart. Arteries thickened. Stands in Romberg with slight swaying. Gait normal. Vision fairly good. Hearing good. Knee and Achilles jerks normal. Plantar flexion of toes is present. Arm reflexes normal. Pupils react to light and in accommodation. Sensation normal.

Diagnosis.—Senile dementia.

Autopsy 11 hours p. m. by S. & R.

Chronic fibrous myocarditis. Chronic congestion of tricuspid. and aortic endocarditis. Edema and congestion of lungs. General arterio-sclerosis. Acute congestion of liver and spleen. Chronic interstitial nephritis. Hemorrhagic pancreatitis. Fibro-myomata (?) of stomach. Diverticulæ of intestines. Cystitis.

Chronic external adhesive pachymeningitis. Chronic sulcal leptomeningitis. Frontal and prefrontal atrophy. Gliosis of superior and middle frontal, occipital, and occipito-temporal regions; also of hippocampal gyri. Brain weight 1,325 grams.

Cause of Death.—Pneumonia (?).

Microscopical Examination of the Brain and Cord.—Pyramidal cells are not unusual. Cellular pigment is slightly increased. Spider cells are scattered through the gray matter and there is a slight cellular gliosis in the most superficial layer. In the hippocampal region there is a marked gliosis of the suprastellate layers of gray matter with the formation of hyaline bodies. The walls of the larger vessels contain pigment. In the posterior columns there is a slight degeneration which is more marked on one side. The pia of the cord is thickened and there is a sub-pial gliosis.

Autopsy No. 1275. B. C. Male, aged 73. Admitted D. S. H., June, 1908. Died September, 1908.

Family History.—One cousin insane for a short time but recovered. No epilepsy or intemperance in family.

Personal History.—Grammar school education. Did not become interested in studies. Odd and stubborn. Not successful in business. Changed occupations often. Drank moderately but could not stand much liquor. Four months before admission memory began to fail. Excited and cross at times. Uncleanly.

In Hospital.—Generally quiet though restless at times. Spoke little but answers were relevant. Disorientated for time and place. School knowledge very poor. Writing showed some tremor. Attention poor. Memory poor for recent events and impaired for remote occurrences. No hallucinations present. No delusions. Impressibility poor. No insight. Untidy at times.

Physical Examination on Admission.—Fairly well nourished. Heart enlarged, with diastolic murmur over aortic area. Pulse

regular but weak. Arteries tortuous. Urine shows trace of albumin and many hyaline casts. Gait is very feeble. Extremely deaf but could usually be made to understand. Vision good. Pupils equal, regular, and small. React slightly to light and in accommodation. Tendon reflexes lively. All superficial reflexes absent. Sensation about normal.

Diagnosis.—Senile dementia.

Autopsy 3 hours p. m. by E. E. S.

Scalp wound, and various abrasions on others parts of the body. Slight icterus. Erysipelas of scalp. Fracture of left third costal cartilage with suppuration extending into superior mediastinum and communicating with left pleural cavity. Acute fibrinous pleuritis, left. Hypertrophy of heart and chronic fibrinous myocarditis. Hydropericardium. Chronic mitral and aortic endocarditis with small vegetations. General arterio-sclerosis with calcification. Diffuse aneurysm of both iliac arteries. Small hemorrhages of the spleen. Chronic interstitial (arterio-sclerotic) nephritis. Cholelithiasis and chronic cholecystitis. Adhesions around gall bladder.

Chronic external adhesive pachymeningitis, orbital. Chronic leptomeningitis of base and along vessels of convexity. Narrowing and gliosis of both frontal lobes, and of both superior temporal lobes, anteriorly. Brain weight 1,285 grams.

Cause of Death.—Erysipelas.

Microscopical Findings in the Central Nervous System.—Pyramidal cells not unusual. There is a sub-pial gliosis and in places small groups of neuroglia cells are found just beneath the pia. Spider cells occur both in the gray and the white matter. The blood vessels are not thickened but contain pigment. In the superficial cortical layers there is a slight perivascular gliosis. The only change in the cord is a slight bilateral pyramidal tract degeneration.

Autopsy No. 1288. A. M. Female, aged 86. Admitted D. S. H., October, 1908. Died November, 1908.

Family History.—Both maternal grandfather and grandmother had senile dementia. Negative on father's side. Mother demented in old age. Two sisters aged 85 and 89, respectively, show signs of senile dementia. No alcoholism or epilepsy in ancestry.

Personal History.—Common school education. Married at 26; married life happy. Always distant and rather stubborn. Worried over trifles. Had pneumonia three times during last eighteen years. No trouble at the time of the climacteric. Always strong mentally and physically until four years before admission, when following an attack of bronchitis patient began to fail. Before, had been very religious but now lost all interest in religion. Memory began to fail. Two years later nocturnal restlessness developed. Became irritable and threatening. Delusions of persecution developed, and later auditory and visual hallucinations. Later did not know where she was, and did not recognize her own son and daughter. Speech became disconnected. Speech was thick during whole time of illness. Had no shock.

In Hospital.—Restless day and night. Memory very poor.

Impressibility very poor. Attention poor. Completely disorientated. Some insight. Appetite poor. Untidy at times. Resistive at times. Irritable. No hallucinations or delusions. Articulation poor. After pneumonia developed was unconscious four days before death.

Physical Examination on Admission.—Poorly nourished. Arcus senilis. Edema of legs. Respiration 26. Heart intermits occasionally. Pulse 70; of high tension. Arteries tortuous. Urine contains albumin, erythrocytes, and hyaline casts. Too feeble to walk unassisted. Tendon reflexes diminished. No Babinski. Achilles reflexes absent. Pupils are regular, but do not react either to light or in accommodation. Vision and hearing fairly good. Sensation normal except over the edematous area.

Diagnosis.—Senile dementia.

Autopsy 39 hours p. m. by P. & C.

Emaciation. Edema of arms and legs. Arcus senilis. Lobar pneumonia. Acute and chronic obliterative pleuritis of both sides. Calcified nodule (tuberculous?) in one apex. Hypertrophy of heart. Chronic fibrous, mural and valvular endocarditis. General arteriosclerosis with ulceration and calcification. Chronic fibrous peritonitis with ascites. Chronic perisplenitis. Chronic interstitial nephritis. Chronic hepatitis and perihepatitis. Cholelithiasis and atrophy of cystic duct. Chronic interstitial pancreatitis. Chronic cystitis.

Chronic external adhesive pachymeningitis. Slight chronic leptomeningitis along vessels. Marked sub-pial edema. Encephalomalacia (?). Marked convolutional atrophy, frontal and parietal. Basal vessels moderately sclerosed. Brain weight 1,260 grams.

Cause of Death.—Lobar pneumonia.

Microscopical Findings in the Nervous System.—Sections of the brain show nothing. Weigert preparations of the cord show a slight degeneration of the tract of Goll in the cervical region.

A comparison of the course and symptoms of the psychoses in the above cases with the clinical manifestations of those cases that were found to have brains showing definite arterio-sclerotic or senile atrophic changes does not disclose any very striking differences. This fact is true both when the clinical picture as a whole is concerned, and when the percentages of the occurrence of the chief facts in the history and clinical study are compared in parallel columns. It is true that in some of the cases the histories were very incomplete and the period of observation in the hospital brief, and that had a more thorough study been possible, a different conclusion might have been reached; but taken by and large it does not seem wise to question the diagnoses of the clinicians.

As far as the final outlook in the cases of this group is concerned, there would seem to be little practical value in attempting to differentiate between a manic-depressive or other functional

state and the organic conditions. The age of the patients at the time of admission to the hospital (71–86 years, average 77 years) or at the onset of the psychosis (68–82 years, average 74 years), the poor physical condition in most of them, and the advanced cardio-vascular-renal lesions found in each almost preclude a favorable prognosis, whatever the psychosis. This conclusion is further supported by the fact that in the two patients who remained in the hospital a year or longer, no improvement in the mental symptoms was noted.

In attempting to find an anatomical basis for the mental condition, it is not necessary to seek far either with regard to the body as a whole or in the central nervous system. A consideration of the gross and microscopical findings in the viscera and central nervous system as well as the findings of the physical examination lead one to the conclusion that rather than being purely functional, these psychoses have an organic basis doubtless modified and accentuated by disturbances of nutrition and by intoxication. In a majority of the cases a high grade of malnutrition and of muscular enfeeblement was present at the time of the first examination; and the low general resistance is evidenced by the number of deaths that resulted from septic processes. In all the cases there were more or less marked evidences of disease of the cardio-vascular-renal system, both in life and at autopsy. This last finding assumes great importance in view of the recent work of Southard (2) on the rôle of Bright's disease in the production of certain types of delusions, and of that of Southard and Canavan (3) on the incidence of renal disease in the insane. These authors and others have found that the fact that mental disturbances do not occur in all cases of Bright's disease does not invalidate the argument that Bright's disease has a close connection with the psychosis, in certain cases—cases perhaps with naturally unstable nervous system. The impression of the mental attainments of the individuals in this series as obtained from the histories is not that their nervous systems were particularly stable or resistant to noxious agents. None apparently ever occupied a position of any importance in the community in which he resided, and none ever enjoyed any measure of prosperity. The men were farm laborers or keepers of small shops. Two of the women entered the hospital from almshouses and two others had bad family histories. In three instances peculiarities of disposition were sufficiently marked to be noticeable to acquaintances. In all cases in which it is mentioned in the histories the education was that obtainable in grade

schools. Apparently in this series, then, whatever toxic or nutritional disturbances might result from cardio-renal disease were acting on nervous systems inherently weak.

In addition to the somatic lesions, other factors that may have played some part in producing psychoses were defects of hearing, present in 6 instances, and a moderate use of alcohol, recorded in the histories of three cases.

Although no typical arterio-scerotic or senile atrophic changes were found in these brains, it is not necessary to conclude that the mental changes were the result purely or even chiefly of a disturbance of function through nutritional or toxic influences. Rather must one conclude after a study of the findings in the nervous systems that in most of the brains organic changes, of a rather indefinite character perhaps, but nevertheless organic, certainly were present. In seven brains either increase in consistency, or convolutional atrophy or both were noted in the macroscopical examination. In six cases there was noted a chronic leptomeningitis. In each of the seven cases in which the cord was obtainable for study were found evidences of chronic degeneration corresponding fairly well to the position of the various fiber systems. This last finding seems especially worthy of emphasis. Although not necessarily indicating brain disease, the cord findings nevertheless give one the impression that such disease is probably present though in a form not demonstrable by the methods used. The arrangement of fibers in definite systems and the length of individual fibers are characteristics of the spinal cord that render comparatively slight degenerations easy to distinguish, whereas in the brain a similar change would not be evident owing to the intermixing of fibers of different lengths and subserving different functions. It requires no great effort of the imagination to connect the brain with the pyramidal tract degeneration found in one case, but the coexistence of brain changes with the posterior column degeneration found in 6 cases is less evident. Posterior column degeneration, however, is not rare in the aged (Hirsh[4] and others) and has been found in other pure brain lesions, as, for instance, tumors.[5] Since another explanation of the degeneration is found in only two cases (arterio-sclerosis, meningitis), one must assume general causes; and general causes that affect the cord are quite as likely to affect the brain also.

With reservations in view of the limited number of cases studied and of unavoidable shortcomings in the histories and clinical notes in some of the cases, the following tentative conclusions seem justifiable:

1. With the information at hand it does not seem justifiable to question the clinical diagnosis in any one of these 10 cases of senile dementia.

2. Even with a diagnosis of manic-depressive psychosis or of some other functional condition, the age and general condition of the patients would preclude a good prognosis.

3. In view of the recent studies of Southard and others the cardio-renal lesions found in all the cases assume great importance in a consideration of the etiology of the psychoses, in the present series particularly since they coexisted with brains that one might assume to be congenitally weak.

4. Although there were no conclusive arterio-sclerotic or atrophic alterations in the brains, the system degenerations found in the cords support the assumption that brain changes were present though of such a nature as not to be demonstrable by the methods used. (The material for this work was obtained from, and most of the work was done in the laboratory of the Danvers State Hospital.)

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Society Proceedings

PHILADELPHIA NEUROLOGICAL SOCIETY

March 23, 1917

The President, Dr. Williams B. Cadwalader, in the Chair

SOME BLOOD STUDIES IN CHOREA

By Frederic H. Leavitt, M.D.

At the suggestion of Dr. Charles W. Burr, Dr. Leavitt examined the blood in eighty cases of chorea, principally to determine the frequency of eosinophilia and what effect the presence of herpes labialis had upon the eosinophile count. The cases studied were all in patients at the Orthopedic Hospital and Infirmary for Nervous Diseases; the severely ill were confined to bed, the mildly ill attended the clinic. All were instances of Sydenham's chorea, in the active stage of the disease, between the ages of three and thirty, the average being ten years. Fifty-three were girls—twenty-seven boys. All were white with the exception of one apparently full-blooded negro boy, who had the disease in a most violent paralytic form.

Fifty-eight of the cases were of the milder type (72 per cent.) and twenty-two (28 per cent.) had a very severe chorea. Fifty-five were primary cases, fourteen were suffering from their second attack, six were in their third, three in a fourth and two were having their fifth recurrence.

A record in each case was kept relating particularly to age, sex, severity of the movements, whether it was a primary or recurrent attack; the presence of herpes and heart lesions together with a history of a preceding rheumatism; the duration of the disease, as well as a differential count of the leucocytes. In thirty cases a full blood count was made.

An eosinophilia of 7 per cent. to 16 per cent. was found in 12½ per cent. of the cases. Twenty-five per cent. gave an eosinophilia of 4 per cent. to 7 per cent., while 62½ per cent. gave an eosinophilia not exceeding 3 per cent. The average eosinophilia for the eighty cases was 3.05 per cent., whereas the average for healthy children of ten years is, according to Francis Wood, 2 per cent. to 4 per cent.

The ten children who showed an eosinophilia of 7 per cent. to 16 per cent. were primary cases of long duration. Forty per cent., as contrasted with 27 per cent. of the total studied, were severe cases and showed herpes labialis. The presence of a heart lesion, of preceding rheumatism, and of a duration of over one month, did not seem to affect the eosinophile count.

In the twenty children showing an eosinophilia up to 7 per cent., there was nothing definite, except that the presence of herpes labialis was noticed in 50 per cent. as contrasted with the 27 per cent. of the total studied. As in the cases showing a higher eosinophile count the presence of heart lesion, rheumatism, etc., did not seem to affect the eosinophile count.

Each patient was examined for, and found to be free from, skin dis-

ease (barring herpes), intestinal parasites, gonorrhea and bronchial asthma, conditions commonly causing an eosinophilia. Therefore, eosinophilia from these sources was excluded.

A summary of the cases showing herpes was made and 27 per cent. of the total number had it. This 27 per cent. gave an eosinophilia of 4.4 per cent. as contrasted with the 3.0 per cent. of the other 73 per cent. Thirty-five per cent. gave a history of rheumatism, as contrasted with 27 per cent. of the total.

It was noted among the severe cases, confined to bed in the house, that facial grimaces were marked and that traumatism of the lips by spasmodic protrusion of the tongue, or by rubbing of the lip with the opposite lip, was very common, and this seemed to be the principal cause of the herpes. This form of traumatism was absent in the milder cases, perhaps accounting for the lessened percentage of herpes in them; as their previous percentage seemed to bear out, herpes was more common in the severe cases. An eosinophilia was found to be more frequent in the severe cases and especially those showing herpes. Presumably then the eosinophilia found was more or less due to the skin condition caused by the self-inflicted traumatism in the more violent cases and was not inherent to the disease chorea itself.

In tabulating the cases showing heart lesions the striking fact noted was that 69 per cent. of the heart lesion cases gave a history of previous rheumatism, as contrasted with the 20 per cent. having a rheumatic history among the total cases.

The frequency of cardiac lesions in chorea subsequent upon rheumatism is noted very frequently among the clinic cases. Cardiac conditions were also noted frequently in the recurrent cases, 50 per cent. of the cardiac lesions being in recurrent cases as against a 32 per cent. of the total having cardiac lesions.

An average of the differential count of all the cases studied showed:

	Per Cent.
Polymorphonuclear leucocytes	58.65
Small mononuclear lymphocytes	30.36
Large mononuclear lymphocytes	4.09
Eosinophiles	3.05
Basophiles	0.625

The normal count as given by Francis Wood is:

	Per Cent.
Polymorphonuclear leucocytes	65–75
Small mononuclear lymphocytes	22–25
Large mononuclear lymphocytes	5–10
Eosinophiles	2–4
Basophiles	0.5

The tables show in the chorea cases a slight increase in the number of small mononuclear lymphocytes.

A total blood count—hemoglobin, erythrocytes, leucocytes—and differential count of the leucocytes was made in thirty of the cases, and a most striking feature was the mild grade of leucocytosis noticed in nearly all, particularly in the primary cases with a rheumatic history, and where the course of the disease had been of short duration. The average leucocyte count of the thirty cases was 11,150; the highest count being 20,720 and the lowest 4,240.

The average tabulation of the Hb, R. B. C. and W. B. C. was noted as follows:

	Hb. Per Cent.	R. B. C.	W. I. C.
In primary cases of short duration	72	4,688,000	11,330
In recurrent cases of short duration	71	4,712,000	10,840
In mild cases of short duration	72	4,689,000	11,510
In severe cases of short duration	70	4,613,000	10,300
In cases showing herpes labialis	75	4,612,000	10,871
In cases with cardiac lesion	73	4,440,000	10,394
In cases with rheumatic history	70	4,850,000	11,464
In cases of six weeks' duration	67	4,790,000	9,344

The average R. B. C. count in the total was 4,664,000; the Hb count was 71 per cent., giving a low color index, or a hemoglobin anemia in nearly all the cases. The lowest Hb count was 52 per cent., the highest 85 per cent. The most marked hemoglobin anemia was noted in those cases of long duration, the average being an Hb of 67 per cent. There was a proportionate reduction in the red cells also, in these cases, and a disproportionate reduction in the R. B. C.'s in cases with a heart lesion. The character of the red blood cells themselves was not changed in any of the cases.

In summary the study of these cases seemed to show that:

I. Herpes labialis was most likely due to mechanical irritation by the patient himself, and that eosinophilia, when present, was due to the skin condition aroused, and not inherent to the disease, chorea, itself.

II. The great frequency of a history of rheumatism in those cases showing cardiac lesions.

III. A slight increase in the lymphocyte count and a relative decrease in the polymorphonuclear-leucocyte count.

IV. A fairly constant low-grade leucocytosis in most cases of chorea, indicating the infective origin of chorea, rather than the theory of a functional neurosis.

V. An anemia of the chlorotic type, with little change in the number or character of the R. B. C.'s, but with a low color index, in a great majority of the cases.

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Dr. Alfred Gordon said that Dr. Leavitt's conclusion in regard to infection based on a leucocytic count is a very interesting one, namely, he said that in view of the large leucocytic count the idea of the infectious origin of acute chorea is a possibility. Dr. Gordon said he wished simply to say that this corroborated the idea propounded by others in regard to blood examination of those who had observed Sydenham's acute chorea following some local infection, or an infectious focus in the system. Several years ago he observed it in two cases of that kind with two physicians in this city. One occurred in a little girl who had an abscess of the tooth. The abscess ran its normal course and was treated by a dentist; suddenly the temperature went up and the following day the girl developed choreiform movements and it was a true case of chorea. The other case was also one of local infection. There were several boils on the body with high temperature when the child developed choreiform movements. It is difficult to say that

these cases are absolutely conclusive that the origin of acute chorea is infectious because the child may have had a predisposition to chorea and these local infections probably hastened the process. At the same time the course of the choreiform movements parallel with the infection was so marked that it was difficult to reject a relationship between the two. Moreover, when the abscess was removed and the child got entirely well and when the boils were removed, the choreiform movements gradually subsided and disappeared. He was glad to hear that high leukocytic counts, which are frequently significant of infection, were found in the cases of chorea investigated by Dr. Leavitt.

Dr. Leavitt said that in the great majority of these cases a fever lasts for ten days and then subsides.

NEOPLASM OF THE INSULA ILLUSTRATING FOCAL DIAGNOSIS

By Tom A. Williams, M.B., C.M., Edin., Washington, D. C.

A preacher and farmer, aged 46, of peculiar family, was seen near Winchester in consultation with Dr. Stuart, of that town. Two years before he had a prepatellar bursitis, the infection of which spread and laid him up for six weeks. Sixteen months after this his wife conceived after a lapse of twenty-three years. She became emaciated and very ill, which caused great anxiety to him and which culminated in a labor of forty-eight hours, during which he stayed up in agony. After this he collapsed, and a state of confusion persisted until seen by Dr. Williams There was a history of dysarthria, with drawing of the mouth and a clumsy feeling of the tongue. Constipation, nausea and occasional vomiting, and soreness of the head had led to a suspicion of autotoxemia. Torpidity and slow responses had increased this suspicion. But the failure to find his words clearly during the preceding few weeks, inequality of the pupils, and increased knee jerks led Dr. Stuart to suspect a lesion of the brain.

Further interrogation led to the admission by his wife that the quality of his voice had become different for the past six months, that drowsiness had been noticed for a year, that his power of thought had seemed diminished, and that peculiar sensations had been complained of in the right hand for six months. The urine was normal. Blood pressure 109.

Examination. Motility.—Mouth deviated to the left when opened; the right side did not open fully. Tongue pointed to the right. The right arm could scarcely be moved, the grasp was very weak, the right leg would hardly move, and the left could not be raised from the bed. The contralateral pressure of the right heel was feeble. The muscles of the right leg were firmer than those of the left; otherwise tonus seemed normal. The patient veered to the right in walking. He spoke only with great difficulty and rarely; and volitional phonation was not accomplished at all.

Reflexes.—The right abdominal was absent, the cremasters were equal, the plantar reflex was flexor to stroking, but extensor to sural pressure. The left plantar was slightly flexor. The patellars were slightly increased, especially the right. The right radial and triceps were increased, the iliac and maxillary could not be elicited.

Sensibility.—No defect could be found, even the sense of attitudes appearing intact. The pupils were unequal, reacted to light. The optic papilla was normal.

Psychologically the understanding seemed complete. There had been no abnormal emotional reactions, except worry about his wife's condition.

Summary.—The grounds for diagnosis were the history of the right

arm paresthesia, the history of dysphonia, the history of torpor, headache, nausea and vomiting, the presence of aphemia and right-sided spastic hemiplegia, paraplegia, and unequal pupils, the absence of kidney disease and arteriosclerosis, the normality of sensibility and the understanding of the spoken and written word, with conservation of intelligence.

The factors not germane to the diagnosis were the family history of peculiarity, the infectious bursitis, the long anxiety and lack of sleep during his wife's illness.

The diagnosis of neoplasm of the island of Reil was made with great confidence in spite of the absence of papilledema, very violent headache or severe vomiting. The reasoning was based upon the very clear history of sudden lapses in motor speech during preaching months before worry or general ill-health had occurred; the paresthesia and clumsiness of the right hand while he was otherwise well and the signs elicited at the examination, which indicated impairment of the motor projection fibers and the motor speech fibers. The fact that the brain fibers had been implicated so long before the leg was affected showed that the lesion was not in the capsule, but was either cortical or subcortical. A cortical lesion would not have led to impairment of speech until it reached the left inferior frontal region, long before which it would have caused a severe brachial paralysis, which had not occurred. Therefore, with regard to the arm fibers the lesion must be between the capsule and the cortex in a position where it could implicate fibers going to the speech apparatus. Such a position must impinge upon the island of Reil and it was therefore to that region that the lesion was attributed.

In case the neoplasm were upon the surface of the island and therefore accessible, osteoplastic craniotomy was advised rather than a mere decompression, which would not permanently improve the function of speech and arm.

The next day this operation was performed by Dr. Stuart and assistants.

In making his report Dr. Stuart wrote the following letter:

"The tumor, a part of which I have mailed to you to-day, was-situated just above and internal to the island of Reil and shaped like a flattened egg (and about the size of a duck egg), evidently originated just outside of left lateral ventricle in white substance and pushed forward into the frontal area. The part I sent you was the anterior end and the only part showing any separation from brain substance at all. The balance was infiltrating and showing no lines of demarkation except in color, which was a pinkish gray, with small areas of brown stains (hemorrhages).

"Yesterday morning at ten o'clock I did a Hartley-Krause osteoplastic flap operation, exposing a large area from Rolandic fissure forward two inches. Everything looked perfectly normal, except when the dura was turned down the brain pushed into the opening. Everywhere the brain was soft and pulsating. After the operation he never regained consciousness and died this morning at 11:30, twenty-four hours after the operation. He simply became more and more comatosed and so died. He had several attacks of tremor in left arm and leg, but never moved the right side. Peculiarly about one half an hour before he died left pupil became widely dilated and right one contracted down to small point.

"Postmortem showed that the tumor was half an inch from cortex and before sectioning the brain we could feel absolutely no difference in density between the two sides and different parts of the same side."

The tumor was a gliosarcoma histologically (Major Whitmore).

Dr. Charles K. Mills said that lesions limited to the island of Reil are of course of great interest. This case he thought lost some of its interest because of the size of the lesion and because the tumor exerted pressure and

invaded neighboring regions. What he said was no serious criticism of the diagnosis. Dr. Mills said his own view, which was well known because of his communications on aphasia, was among other things that the island or its anterior portion with the posterior part of the third frontal convolution were jointly a cortical center for speech.

Dr. Alfred Gordon asked whether there were any symptoms of sensory aphasia.

Dr. Tom A. Williams replied that there were no symptoms of sensory aphasia. The understanding of the spoken and the written word were complete. Dr. Williams said that of course he did not pretend that the tumor was only in the insula, but it was the only place he thought of. He thought it extended into the projection fibers of the arm. It was in, therefore, the subcortical insular region. How deep he did not know. The leg was affected laterally, only showing it began in the subcortical insular region, where it would implicate the speech motor fibers and the arm motor fibers without involvement of the sensory fibers.

Dr. F. X. Dercum asked whether the patient had dysarthria.

Dr. Williams replied that there was a prolonged history of dysarthria from time to time. When he saw the patient he could not speak at all volitionally. It was more like a case of complete dysarthria than a case of true arthremia. The case, of course, could not be studied very long.

DIFFUSE MYELITIS OR DISSEMINATED SCLEROSIS

By Alfred Gordon, M.D.

Patient, woman of 35, three years ago, after a slight malaise, suddenly felt pain in her limbs and in a few hours lost power in all four extremities. In a few days she regained power in her right lower limb. At that time she was confined to bed and was unable to sit up or hold up her head. The sphincters of bladder and rectum were equally paralyzed. In two months she developed atrophy of the small muscles of the hands. For three years she was treated in various hospitals with massage and improved.

At present the following condition is observed: While there is no rigidity in the lower limbs on passive motions, yet the gait is that of one who has a spastic paraplegia. The knee jerks are much increased, Babinski is on both sides and paradoxical reflex on the right side. The diminution of power in various segments of the limbs is unequally distributed. Sensations are diminished in the right leg. The arms are weak and the grip of either hand is weak, more on the right than on the left. The right hand is in the form of main en griffe, the small muscles are all atrophied. In the left hand the atrophy is very slight. The trapezii are also weak. Sensations of the right arm are diminished. In percussing the extensor muscles of the right hand an extension of the hand was observed; while percussing the dorsum of the left hand extension was not observed but only flexion of the fingers. As the extensor muscles are supplied by the sixth, seventh and eighth cervical segments, it is to be supposed that these segments are involved on the left side.

The eye examination is negative. Wassermann on serum and spinal fluid—also Lange's reaction—are all negative. Cytological examination is also negative. The function of the bladder is only occasionally disturbed (incontinence).

Dr. Augustus A. Eshner wondered if many of these symptoms might be explained on the basis of the diagnosis of meningitis. Dr. Gordon said nothing about the eyes. It seemed to Dr. Eshner that we might have a mild meningitis extending through the periphery of the cord.

Dr. Tom A. Williams asked whether there was a lymphocytosis. Dr. Gordon said nothing about the cytological condition of the fluid. It seemed of great importance in a case like this.

Dr. S. F. Gilpin asked what treatment this case had during the acute condition.

Dr. Gordon replied that with regard to Dr. Williams's question the cytological examination report from the pathologist came negative. The question of meningitis at that time he, of course, did not know. He saw the patient only two or three months after the onset and the last time about a month ago. In regard to treatment, she said she was treated in several hospitals by massage, electricity and general measures appropriate to cases of that kind. In spite of the negative Wassermann Dr. Gordon put her on mercury, of which she had half a drachm regularly twice a day for a month. The patient is better and her grip is better. In regard to the negative Wassermann, personal investigations of this subject had shown him that positive Wassermanns are present in only 60 or 70 per cent. In a number of cases with negative Wassermann on spinal fluid and serum, when clinically they suggested syphilis and were treated accordingly, results were favorable.

A CASE OF SYPHILIS AFFECTING THE OPTIC AND AUDITORY NERVES

By C. S. Potts, M.D.

P. M., 56 years old, came to the Philadelphia General Hospital February 14, 1917, complaining of deafness in both ears, impaired eyesight, worse on the left side, and lightheadedness when walking.

He had a chancre fourteen years ago, otherwise previous history is negative.

Present illness began about nine weeks ago; he then noticed that he could not see as well as formerly. Shortly after this failure in his hearing was noticed by his employer, and about this time the patient noticed tinnitus and giddiness. The latter was not extreme and was paroxysmal. On February 12, about twenty minutes after blood had been drawn from his arm, he fell to the ground and felt "light in the head." He was not unconscious.

Optic neuritis was found by Dr. Langdon at St. Agnes Hospital and involvement of the auditory nerves by Dr. Parrish.

When admitted to the Philadelphia Hospital he could only hear when the mouth was held within an inch or so of his ear and the voice raised to a shout. General examination was negative.

The Wassermann reaction was strongly + in both blood serum and cerebrospinal fluid. There was no increase in the cell count

On February 22, 1917, he was given a dose of neosalvarsan intravenously.

On March 6, 1917, he was again examined by Dr. Langdon, who noted marked improvement since his first examination.

On March 16 and March 19 he was studied by Dr. Jones by Bárány methods, who reported disease of the labyrinth and eighth nerve.

Dr. Isaac H. Jones said that he had tested this man by the Bárány tests. He was absolutely stone deaf in both ears and had no reaction in the vestibular part of the internal ear on either side. The vertical canals and horizontal in both ears were without function. Turning rapidly failed to produce the slightest response by nystagmus or past-pointing. Absolutely no function of either the cochlear or vestibular portion of either eighth nerve existed. This was the result of the first examination. Now he shows fair nystagmus commensurate with return of auditory function.

Dr. G. W. Mackenzie said the patient was brought to his office by Dr. Jones a few evenings ago with the object of having him make galvanic tests and determine, if possible, the location of the lesion. The reaction with the cathode and anode were considerably below normal on both sides.

From careful tests upon several hundred normal individuals Dr. Mackenzie has found that when the cathode is applied to the ear (small ball electrode over the tragus pushed into the meatus) and applying 4 M. A. current, there is produced a mixed rotary and horizontal nystagmus to the same side; while the anode with the same strength of current produces a nystagmus to the opposite side, so that the normal reaction may be expressed as follows: Right ear—cathode 4 M. A. produces rotary nystagmus to right, anode 4 M. A. produces rotary nystagmus to left; left ear—cathode 4 M. A. produces rotary nystagmus to left; anode 4 M. A. produces rotary nystagmus to right.

Any deviation from these normal findings is an indication of some pathologic condition in the inner ear or nerve.

Furthermore, in those cases of one-sided labyrinth destruction, say of the right side (cases known to be with destruction, through an operation for exenteration of the labyrinth in cases of labyrinth suppuration), the cathode to the right ear produces a nystagmus to the same side, but requires from seven to eight milliamperes. That the right side reacts at all in this case indicates that something is reactive. Since the end organ in the inner ear is destroyed, the reaction must be from the nerve stem, certainly not the inner ear. Besides it has been found in these cases where the inner ear has been destroyed the exposed nerve trunk reacts when the cathode is applied to it directly, even though the patient is under ether narcosis. The reaction is manifested by a conjugate deviation of the eyes to the opposite side, the equivalent of a nystagmus to the same side in a wakeful condition. The typical reaction of a pure labyrinth destruction of the right side is as follows: Right ear—cathode 7 or 8 M. A. produces the slightest degree of nystagmus to the right, anode 1 or 2 M. A. increases the nystagmus to the left; left ear—cathode 1 or 2 M. A. increases the already existing nystagmus to the left, anode 7 or 8 produces a slight degree of nystagmus to the right.

In a case of a nerve lesion with complete loss of function, from neuritis or meningitis, let us say that of the right side, no amount of current or at least the strongest current the patient can tolerate (14 to 20 M. A.) will produce any effect on the affected side. The typical reaction for right-sided nerve destruction is as follows: Right ear—cathode 14 to 20 M. A. produces no diminution in the spontaneous nystagmus to the left, anode 14 to 20 M. A. produces no effect; left ear—cathode 1 to 2 M. A. produces an increase on the nystagmus to the left, anode 14 to 20 M. A. produces no effect.

Now in the case under discussion it was found that with 10 to 12 M. A. with cathode and anode applied to the right side, there was a trace of reaction present. This reaction does not compare with the normal, the one-sided labyrinth destruction, or the one-side nerve lesion. That there was positive reaction with these stronger currents would exclude complete loss of function in the nerve. That there was not reaction with much weaker currents, say 7 or 8 M. A., would indicate that there was not a pure labyrinthine lesion; so that Dr. Mackenzie is forced to conclude that there is a mixed condition, a lesion of both the labyrinth and nerve and that there is a remnant of function in the nerves. Nor is this at all strange in view of pathologic studies in cases of syphilis. We find similar conditions in the eye; neuro-retinitis for the retina is merely the expanded peripheral termination of the nerve, the same as the neuro-epithelium of the crypta ampullaris.

The case in question is neither strange nor rare and is typical of its kind.

REPORT OF A CASE SHOWING ATAXIC GAIT AND SPEECH DISTURBANCE

By Samuel Leopold, M.D.

Patient, age 51, white male, married.

Chief Complaint.—Difficulty in talking and unsteadiness in his gait.

He states that his present trouble came on gradually during five years. His wife states that for twelve years he has shown some unsteadiness in walking, and difficulty in talking, but that this trouble has gradually grown worse during the last five years.

Previous Medical History.—Hit on side of head just in front of left ear by a brick when five years of age. Wound discharged for several years.

History of slow mental development in childhood.

Social History.—Alcohol and tobacco moderate. Denies venereal infection.

Neurological Examination.—Pupils equal, react to light and accommodation. No extra-ocular palsies. No nystagmus. No paralysis of cranial nerves. Tongue protrudes in median line. Speech at times distinct, at other times spastic or explosive, like the pseudo-bulbar type. Station normal. No motor or sensory disturbances in upper extremities. No ataxia in finger-to-nose test. No motor or sensory disturbances in lower extremities. No ataxia in heel-to-knee test. Gait is unsteady, spastic-ataxic. Knee jerks not increased. No Babinski. No ankle clonus. Eye grounds normal.

Laboratory Report.—Urine examination negative, Wassermann of blood negative, Wassermann of spinal fluid negative, Noguchi negative, cell count 3 per cm.

The diagnosis in this case is difficult. The picture resembles an atypical form of lenticular disease. The insufficient data in the early history of this case makes the question of a residual infantile palsy, or one of the heredo-degenerations, uncertain.

Dr. Charles W. Burr said that if he were compelled to make a diagnosis, it would be paralysis agitans. He based this opinion on the ulnar distortion, the somewhat woodeny face, the speech, and the gait; each of these symptoms made one think of paralysis agitans, though no single symptom was typical.

Dr. Alfred Gordon said that the case reminded him of cases described by Clark, of New York, of cerebro-cerebellar ataxia. The fact that a man had some ataxia when he was a child showed that the condition dates from childhood. The attitude of the patient, the manner of throwing his trunk backward in walking, inability to stand, suggest the possibility of congenital anomaly involving the cerebellum as well as the cerebrum. The cases described by Clark died early. The cases described by others lived to adult life and even middle age.

Dr. S. Leopold said that this case presented itself as a very puzzling one to him. He considered Friedreich's ataxia and multiple sclerosis and old infantile diplegia and congenital cerebral process and lenticular disease. He regarded as against the diagnosis of Friedreich's ataxia the fact that the man did not show any ataxia at all, except in walking. He had no postural ataxia and Dr. Leopold said it was impossible to get a good early history. The wife had stated that his unsteadiness was of recent development and then only after careful study he found that it reached fairly early; he was backward in intelligence and different from the other brothers and sisters.

Dr. Charles H. Frazier and Dr. Thomas Hale read a paper on Chordotomy for the Relief of Pain. Preliminary Report of the Results of Operation in Two Cases.

Dr. W. G. Spiller said that he thought that it was a matter of very great satisfaction to see the relief of intense suffering that could be produced in this way. The patient to whom Dr. Frazier referred, the man with inoperable tumor of the spinal cord, was decidedly relieved. Dr. Spiller said the man had no pain at all after the operation, he was entirely relieved of the agonizing pain from which he had been suffering.

Dr. Frazier asked whether there were any views as to the precise level at which this section should be made. That was a matter which had not been taken up in any detail in the papers he had read in the literature on the subject.

Dr. Spiller replied that he thought the incision should be made if the tumor is confined to the lumbar and sacral regions, in the middle or upper thoracic region.

Dr. S. F. Gilpin presented an unusual form of myopathy.

Dr. G. E. Price said that Dr. Gilpin's case was a beautiful example of pseudomuscular hypertrophy. Some eight or nine years ago Dr. Price had presented before the Society a case of myopathy of unusual distribution. The patient, a girl of 17, had marked wasting of the serratus and rhomboid muscles, causing a condition which superficially resembled Sprenkle's deformity. There was absence of facial, humeral and crural involvement, the myopathy being limited strictly to the subscapular region.

Dr. Spiller said he was reminded of a case in the University Hospital a number of years ago which was reported by Dr. Andrew H. Woods. Dr. Spiller examined a piece of muscle excised from the man. In a paper before the International Congress in London four years ago Dr. Spiller referred to this type as one of the types of muscular dystrophy. He observed a similar case at the Polyclinic Hospital many years ago. In this form of dystrophy the individual looks as though excessively strong, but he is excessively weak and yet there is no atrophy that can be detected in any of the muscles.

Dr. Joseph Sailer said that recently he had seen a case of hypertrophic muscular dystrophy. He desired to mention the treatment employed. At the expiration of a year the statement was made by the doctor that the improvement was remarkable. The treatment consisted of the administration of powdered pituitary extract, and he gave reasons why he thought the pituitary gland was the cause. One can understand a somewhat similar condition occurs in the skeleton in cases of pituitary disease. Of course this was not the basis for his treatment. The basis of his treatment existed on certain very minute and definite studies of his case, the metabolism which caused the pituitary disease. Dr. Sailer said he did not know whether the case had been published yet, but in a case of this kind it would be interesting, if no other treatment was under consideration, to see if the pituitary gland might be of any possible benefit.

Dr. F. X. Dercum said he had never seen in a child a condition just like this. The hypertrophy was remarkably evenly distributed. Dr. Spiller's cases were all older patients. This child is only nine years. The affection began at five or six years.

Dr. S. D. W. Ludlum said that in eight or nine cases of muscular hypertrophy he got reactions—Dr. White did them for him—with adrenalin and pituitary. The argument would be the same as that Dr. Sailer advanced.

Dr. Gilpin said that in the history of this child it appeared that he was a seven months' fetus. The mother stumbled over a dog and in twenty-four hours the child was born. The mother later on committed suicide. There were three children born by this mother; one of them died of some bowel complaint, the other is apparently healthy. Dr. Gilpin said they had been treating the child with extract of thymus gland. The X-ray showed very

little thymus in the child. As to syphilis he did not know. He had not performed any Wassermann on the father, or mother, or on the child.

Dr. Joseph Sailer presented reports of (1) a case of monocatalepsy; (2) tumor of the lower cervical cord; (3) Brown-Séquard's syndrome; (4) choked disc, apparently acute.

Dr. S. Leopold asked, in reference to the first case, whether Dr. Sailer had stated that the patient had been in the garage and become unconscious following that.

Dr. Sailer answered yes.

Dr. Leopold questioned whether his condition was due to gasoline. Some years ago he experimented with the question of using gasoline as an anesthetic and tried it on dogs to obtain anesthesia and was able to operate. The difficulty he found in getting the dogs under the anesthetic was that convulsions were produced.

Dr. Charles S. Potts said that in reference to what Dr. Leopold stated, several years ago he reported a case in which a man contracted encephalitis from inhaling fumes of gasoline. Did Dr. Sailer's patient inhale any gasoline?

Dr. Sailer said apparently no.

Dr. Potts said he thought one would have to inhale it for a long period of time.

Dr. Lewis Fisher read a paper on The Nervous Mechanism in Sea Sickness.

Dr. Joseph Sailer said that the speaker had made one statement that he thought was at least of interest and would bear criticism. That is the statement that vomiting is commonly due to stimulation passing along the vagus. Commonly it is due to spasm of the sphincters of the gastrointestinal tract. The sphincters, the pylorus, the ileo-cecal valve—the spasm of the pelvis is apparently brought about by a mechanism which is identical with the mechanism that relaxes the nonstriated muscular fibers of the gastrointestinal tract. Per contra, we have the condition if we have stimulation of the nonstriated muscles of the gastrointestinal tract. If the gastrointestinal tract relaxes the sphincters the mechanism fails to act, causes the sphincters to contract and the muscles of course to relax. The proof of this mechanism is the vagus nerve. The proof of this is that in certain cases of vomiting it is possible to check it promptly and entirely by the administration of pilocarpin, which stimulates the autonomic nervous system, which stimulates the nonstriated muscles of the hollow organs and relaxes the sphincters, allowing a normal flow. Dr. Sailer said he had been able to prove that clinically several times and he understood experiments were under way in the laboratory. The same thing had also been shown experimentally. It would be interesting, therefore, in these cases of sea sickness if someone should take the trouble to find out whether there is a persistent spasm of the sphincters associated with it.

Dr. Tom A. Williams queried whether these cases were not consistent with another explanation of the mechanism than that Dr. Fisher had advanced, namely, without supposing that the vestibulo-spinal tract has anything to do with the mechanism of vomiting at all, but assuming that the mechanism of vomiting is a mechanism which has to do with the vagus nucleus and supposing that, as in the case in question, it was merely the afferent impulse which was blocked in these cases and that we have merely then a reflex vomiting from activation of the vagus nucleus by vestibular stimulus.

April 27, 1917

The President, Dr. Williams B. Cadwalader, in the Chair

Dr. William Drayton, Jr., presented a case of general ataxia of sudden onset in a child.

A CASE FOR DIAGNOSIS

By F. X. Dercum, M.D.

The case was that of a young man, 28 years of age, single, farmer by occupation, who presented a negative personal history, save that when he was six years of age it was first noticed that he did not speak plainly. This grew gradually a little more pronounced. He made reasonable progress at school and later began doing farm-work. Nothing further was noticed in regard to his case until he was twenty-seven years of age, when he began to have difficulty in walking and could no longer work as well as formerly.

At present he stands with his head bowed forward, with the arms slightly flexed, the attitude suggesting a case of paralysis agitans. His gait is somewhat ataxic and irregular. There is no festination. There is a decided ataxia of the arms and occasionally athetoid movements noted in the hands. The knee jerks are slightly plus, especially the left; no ankle clonus and no Babinski sign. There are no sensory losses. There is a marked dysarthria; the patient has great difficulty in pronouncing consonants, so that the speech is almost unintelligible. The tongue is protruded slowly and apparently with effort, but there is no wasting. The lips are protruded and the angles of the mouth retracted with effort and some grimacing. There is no automatic laughing or crying. There is also some drooling. The patient has marked difficulty in swallowing, though regurgitation does not take place through the nose. The pupils are equal but react a trifle sluggishly to light; no reaction to convergence can be obtained. The converging power of the eyes seems to be nil or greatly diminished and there is apparently a loss of the function of accommodation.

The case upon the face of it suggests a pseudo-bulbar palsy, though the lesion may be cerebellar. The most interest in the case, however, centers in the family history, which is given by his physician as follows:

The paternal grandmother suffered from a similar symptom group as did also the father and a paternal uncle. All of these patients began to show the symptoms in the middle or latter period of life. Further a brother and a sister of the patient also suffer at present from the disease. The inference would seem to be justified that we have here to deal with an abiogenetic degenerative affection, familial in character.

Dr. Spiller asked whether Dr. Dercum had considered the hereditary cerebellar ataxia of Marie.

Dr. Dercum said he had thought of Marie's heredo-cerebellar ataxia and that this was one of the possible diagnoses in the case. When he first saw the boy he thought also of an anomalous Friedreich's ataxia. Such late cases as those of the grandmother, the father and uncle were remarkable. Age, Dr. Dercum said, he supposed was no guarantee against the appearance of a degenerative change.

Drs. William G. Spiller and G. E. de Schweinitz presented a paper on The Effect of Lumbar Puncture in Three Cases of Choked Disc. (Published in the July issue of this Journal.)

Dr. Francis X. Dercum thought that the treatment really marked an epoch in the therapeutic procedure. He thought the cautious withdrawal of

very small amounts of spinal fluid with such brilliant results was very suggestive.

Dr. Theodore H. Weisenburg said that about ten years ago he saw in the Episcopal Hospital, under the care of Dr. Robertson, a clergyman, who had the symptoms of a tumor of the motor region with a choked disc of about three or four diopters. Dr. Van Pelt also examined him. Because of the man's years and condition operation was thought inadvisable and lumbar puncture was done for the relief of choked disc. After each lumbar puncture the disc came down to practically normal. He was observed for some time until his death. Dr. Weisenburg said he had never been impressed with the fact that lumbar puncture in brain tumor cases was such a dangerous procedure. At least in cerebral tumors it is not very dangerous, although in cerebellar tumors it might be. He had rather the impression that the danger of lumbar puncture had been exaggerated.

Dr. G. E. Price said it might be of interest to mention two cases seen at Jefferson Hospital, one reported recently by Dr. Shannon, the case of a child with double choked disc, but with no definite symptoms of other organic lesion. Under lumbar puncture the swelling of the discs subsided and vision improved. The second case was one of obscure origin, the diagnosis being between a cerebral abscess and a meningitis. A lumbar puncture made for diagnostic purposes was followed almost immediately by the death of the child. An abscess was found at autopsy.

Dr. de Schweinitz referred to the different types of swelling of the optic nerve-head manifesting themselves as choked disc, pure disc edema, and optic neuritis. He pointed out that the disc edemas which are the sequence of blows on the head possessed a quality and an appearance quite different from that, for example, which was present in the boy whose case history had been described, and whose ocular complications followed a sinus thrombosis. Many of these pure disc edemas, which were very similar to the nerve-head swelling which followed the introduction, for example, of a saline solution beneath the dura under pressure, rapidly disappeared without operative interference. The same disappearance of disc edema was sometimes seen in various types of infections, and Dr. de Schweinitz referred to several cases of this character, cases which closely resembled two of those described in the paper which Dr. Spiller and he had presented. This subsidence of disc edema without operative interference, either a cerebral decompression or a lumbar puncture, must be remembered in trying to estimate the value of the last-named operative procedure. None the less, in two of the patients reported in the paper of the evening there seemed very little doubt that the lumbar puncture had had a favorable influence. He again reiterated that although lumbar puncture in Dr. Weisenburg's experience had not proved a dangerous procedure, there was much testimony to show that it must be undertaken with the greatest caution, if undertaken at all, in the presence of increased intracranial pressure as the result of cerebral or cerebellar neoplasm. He spoke in admiration of Dr. Spiller's diagnosis of the conditions in the first patient described in the case histories of the evening, especially as he himself, as well as others who had examined the patient, at first were quite convinced that the ocular phenomena were the result of an intracranial neoplasm.

Dr. Spiller said he thought it was wise to be extremely cautious with lumbar puncture in a suspected case of brain tumor, and he would not be willing to recommend withdrawal of a large amount of fluid. He said the question might be raised as to what effect the withdrawal of such small amounts of fluid can have. It seemed impossible that removal of 2 or 3 c.c. could relieve pressure sufficiently to cause, in the case of the young man with external palsy, such relief in forty-eight hours, but it would seem that

the withdrawal allows adjustment and that by taking away 2 or 3 c.c. the absorption of the fluid may be brought about in a more normal way. If we could be sure that we are not dealing with tumor cases we could remove cerebrospinal fluid with more rashness.

HITHERTO UNDESCRIBED TROPHIC CHANGES IN MUSCLES, JOINT, SKIN AND NAILS, ASSOCIATED WITH OPTIC NEURITIS

By George E. Price, M.D.

A middle-aged negro, unable to stand or walk, presenting marked muscular wasting of the extremities with contractures and joint changes, greatly thickened and curved nails and an atrophic, exfoliative dermatitis affecting the extremities and lower half of the trunk. There was slight drooping of the left upper eyelid and a double optic neuritis with some secondary optic atrophy.

The hands were overextended instead of presenting the usual "wrist drop" of a multiple neuritis.

There were no sensory changes except slight diminution over the soles of the feet and palms of the hands where the skin was greatly thickened.

The sphincters were normal; the reflexes absent; Babinski and ankle clonus negative.

There was no dementia or other mental change and no gastro-intestinal symptoms.

The condition developed one and one half years ago with an attack of dizziness, vomiting and weakness, but no fever nor pain in the joints or extremities.

He had "scrofula" when a child, but denies any severe illness or trauma. He used alcohol and tobacco, but not to excess.

Blood and cerebrospinal fluid Wassermanns negative. Urine negative. Blood cultures and sputum negative. Ordinary blood examination shows a very mild secondary anemia.

It did not seem possible to identify the condition with ordinary multiple neuritis, pellagra, malaria, leprosy, tuberculosis or any recognized dermatitis.

An obscure toxemia affecting both nerves and trophic centers was considered probable.

Dr. Alfred Gordon asked whether an examination had been made for lepra bacillus.

Dr. Price replied that some of the dermatological department thought of the possibility of leprosy, while others did not consider it at all. There were no anesthetic areas and no maculæ. There had been no possibility of contagion.

Dr. Dercum asked if there were any sphincter changes.

Dr. Price said there were no sphincter changes and no sensory disturbance excepting on the hands and feet where the skin was very thick.

Dr. Weisenburg said that he had had experience with leprosy in the Philippine Islands and did not think that Dr. Price's case was one of leprosy.

Dr. F. X. Dercum thought we saw very rarely the changes in the nails and finger tips which are presented by this case. They are exactly like those which Marie included in his description of pulmonary arthropathy. He understood, however, from Dr. Price's description that this man does not suffer from any tuberculosis or any other lesion of the lungs.

Dr. Price replied that the patient had some râles at the base of one lung, but no tubercle bacilli had been found.

Dr. Price stated that the diagnosis of pellagra did not seem tenable. The patient had no gastrointestinal disturbance, no dementia, and pellagra affects the cord and not the peripheral nerves. Dr. Price thought there were not two or three conditions, but one due to some obscure toxemia.

Dr. George E. Price and Dr. Michael A. Burns reported a facial tic of long duration, changed in character by apoplectiform seizures.

Dr. Dercum asked regarding the second case presented whether there was a distinct history here of a stroke.

Dr. Michael A. Burns said that the only history that they thought might have been an attempt at a stroke was the probable weakness that he had.

Dr. Price said that while the case was now less distinct than when he examined it, the interesting feature seemed to be the fact that this man had this sudden onset of what was apparently an apoplectiform attack which intensified his tic on the right side and the paralysis or weakness smoothed out and practically eliminated or cut off the spasm on the left side of the face.

1. THE LUMBAR CERVICAL INTERRELATION SIGN
2. THE MODE OF RECOVERY FROM FOOTDROP IN NEURITIS

By William G. Spiller, M.D.

It is well known that in meningitis if the head is raised the lower limbs may draw up. Dr. Spiller has in three cases noticed a different manifestation. One patient with tumor of the lumbar vertebræ complained to Dr. Spiller that when he raised his head from the pillow he had a feeling of tightness and possibly of pain shooting down the lower limbs. Another patient with clearly the symptoms of a lesion in the lower cord when he turned his head sharply, especially to one side, had pain shooting down one lower limb. Another patient with spastic paraplegia of spinal origin had much rigidity of the neck when she used the lower limbs in walking.

Dr. Spiller has observed that when recovery from footdrop in alcoholic multiple neuritis occurs the long extensor of the great toe and the anterior tibial muscle are usually the first to recover. He was particularly interested in a woman who had a complete loss of power in the peroneal distribution but later when he examined her she had very good power in the two muscles mentioned. A few weeks still later she had recovered power in the other distribution of the peroneal nerve.

CHICAGO NEUROLOGICAL SOCIETY

February 15, 1917

The President, Dr. Harold N. Moyer, in the Chair

Dr. Ralph C. Hamill read a paper entitled The Rôle of Consciousness in the Development of Delusions. (Published in full in the Journal of Nervous and Mental Disease.)

Dr. H. I. Davis said he agreed with Dr. Hamill to a great extent. He was glad of one point which Dr. Hamill had made and that was that hallucinations and delusions were undoubtedly a part of our consciousness if not a part of our personality.

Dr. Meyer Solomon said it seemed to him that in the discussion of any of the manifestations of consciousness we should understand what we mean by the term. Ordinarily there is not a clear understanding of what is meant

by it. The lowest forms of animals have some form of consciousness and if the word is used in the particular sense of awareness, consciousness would apply to all kinds of life. The various grades of consciousness might be divided into four types:

1. Simple consciousness or awareness.

2. Observing consciousness—in dreams we see various images floating, ideas come to mind and very often we have an awareness of these things and observe them, but there is not critical action.

3. Self-consciousness by which one not only observes the thing but also recognizes it as part of oneself. One is able to differentiate between that which belongs to self and does not belong to self.

4. The fourth is the critical type, and that is what we have to deal with in discussing delusional states of any source. That is the type which is built up by the experience of the individual and the education which he has had. From that viewpoint a delusion is nothing more than an interpretation of the idea by the individual and the community. We know that all life is an effort at self-preservation and any idea, no matter how flighty, is an effort at adaptation. The desirable types of adaptation are those which are helpful and those that are not desirable are those which are not helpful. The most desirable are those which are in harmony with the highest ideals of the community in which we live. When the undesirableness of the idea is extreme and a danger to the individual or to the community, or both, we may look upon it as an insane idea. An idea which is looked upon as a delusion may be considered a trial or effort at adaptation. A delusion is nothing but an idea which we view with the critical consciousness of the individual or of the community in which we are. So we may state that when Dr. Hamill employs the term "consciousness" he should refer to the critical type rather than the lower stages. It would be well if we would consider that we have a host of instincts upon which many men are working and making a special effort to decide which are the primary instincts and which the secondary.

Dr. Hamill's discussion dealt for the most part with the instinct of self-assertion.

Dr. Edward S. Leonard said he believed if a man came from good stock and good education he would have no faulty ideas. We know that heredity plays a great part in dementia præcox and similar affections. The lack of decision showed that a patient did not adjust himself to conditions.

EXHAUSTION: ITS ETIOLOGY AND MECHANISMS (LANTERN SLIDES)

By Frank P. Norbury, M.D.

Exhaustion is not limited to the province of mental medicine. Exhaustion deals with some of the most important social phenomena. The human body must be understood as an adaptive mechanism, wherein conflict and selection work out social evolution in the struggle for existence. Selection, through conflict, is determined by internal and external factors which deal with the integration of society and its members as individuals. Individuals must be vitalized, socialized and made ready to compete with the forces of nature, viz.: heat, cold, light, water and all other climatic factors. The external factor of climate has disciplined man for countless ages and made of him a social being. "Selection plays a rôle in sociology, no less important than it does in biology." Modern scientific research confirms this dictum of Hill.

Biological fitness begets social fitness. Man's emotional life, when

studied, gives rational explanation of certain clinical phenomena, as found not only in the individual but in communities, states and nations. Human nature is essentially the same everywhere. Men differ in their social life, largely because the organic constitution of human nature is inadequate in its control of man's logical ideational tendencies. Man is of the species but the species is above man and beyond his individual control. Conflict begins when man's desires, unlimited as they are, meet factors internal and external beyond his control. Exhaustion follows in the wake of conflict

Indefiniteness is a part of conflict—this means instability, and in instability is the source of the vicious circle which leads to and makes possible exhaustion. Emotional instability has much to do with the keeping alive of the vicious circle.

Emotional nature can only be disciplined and readjusted by a power which is essentially moral. The individual cannot establish control over his emotional nature without the aid of society. Society through public opinion, tradition and social sanction furnishes the equilibrating forces governing the individual. Ethics aids in regulating desires and activities and contributes its stabilizing influences, in conduct and by reëducation, readjustment of the personality making life worth while. Biological fitness has to do with social stability, and the fittest society, from a biological standpoint, becomes the fittest from a social standpoint.

Modern Western civilization in Europe and the civilization of our own country enter into this problem. Huntington, "Civilization and Climate," gives us the clue in scientific analysis of the part which climate plays in the great rôle of selection and biological fitness. Climate, as we study it, is shown to be a powerful factor in selection. The maps of energy and of advanced civilization resemble each other.

Race expansion and advanced social environment are found in the energizing climates. Selection, both biological and social, is at work in these climates. The studies here shown prove this. Civilization varies with the stimulation of climate. Seasons are factors and the speeding up of seasonal stimulation shows itself in work done. The influence of seasons likewise affects the exhaustions noticeable under climatic conditions. The curves of seasonal variation in incipient mental disorders, of suicide and general nervous disorders are the same curves noticed in the speeding up in work done, both in industrial and intellectual life. That exhaustion is the basic factor in nervous and mental disorders we all know. That climate and seasonal variations are prominent etiological factors in exhaustion we have noticed in our clinical work. For twenty-nine years these seasonal variations have been noted by the speaker. The low ebb in February with a gradual rise to full tide in June, then the ebb once more until November, then a short flood in November, with gradual ebb in December, and a marked fall to low tide in February. The curves of efficiency and those of exhaustion run parallel courses. These general causes are operative in the whole north temperate zone with reverse curves for the south temperate zone.

The reactions of climate are therefore etiological factors in exhaustion and as such reflect themselves in social and biological selection. In the individuation of the problems of exhaustion, Dr. Geo. W. Crile has approached the understanding of the mechanisms in a most enlightening contribution in experimental pathology. His "kinetic theory" is the most satisfactory of modern conceptions of exhaustion. The clinical pictures of exhaustion, from its very varied causes, are always the same, thus leading us to accept his explanation of the exhaustion of the cells of the energizing organs of the body, viz.: the brain, the adrenals and the liver. Crile's theory has not been accepted as it should be, but like all era-marking scientific advancements, time will give him the credit which is due him.

Dr. Norbury's clinical experience warrants him in accepting these conclusions as to the etiology and form of exhaustion. His theory is in keeping with psycho-pathology and modern social psychology as delineated by McDougall. Likewise the clinical pathology of sleep and the end results of exhaustion as shown in the mental symptoms of confusion, etc., can be confirmed by all clinical observers.

Dr. Meyer Solomon said that it was especially because of personal experience that he had become interested in the influence of climate and weather on exhaustion and behavior, and that he had read the book on "Civilization and Climate" by Huntington and it had made a profound impression upon him and there was no question but that climate was intimately related to the problem of civilization.

He had that very day read William James's "Energies of Men," and while James had not entered into the subject as Dr. Norbury had, it was interesting because it was interwoven with some of the climatic problems. Dr. Norbury had laid great stress upon climate, but Dr. Solomon thought we should not forget that insufficient sleep was a great factor in producing exhaustion in individuals. The problem of alcoholism was also intimately woven with these general problems of fatigue and with the behavior of the individual, and the influence of the body on the mind is seen in many of these factors. We had heard a great deal about the influence of the mind upon the body but not enough had been written of the influence of the bodily state upon the mind and he considered this a field which would aid greatly in the understanding of the influence of all sorts of factors upon the individual. With reference to the views of Crile, the speaker believed it to be true that the majority of scientific men in the United States have a feeling of skepticism as to his findings with reference to the so-called kinetic system. The work that Dr. Crile had brought out was splendid and presented all possible evidence, so that his work could be reproduced by others; his theories would not be accepted. In this connection Kocher of San Francisco had recently published an article in the Journal of the A. M. A., in which he reported the examination of a large number of slides of cortical cells from animals which he had subjected to a state of absolute exhaustion and had not been able to find such changes as Dr. Crile had described.

Translations

VEGETATIVE NERVOUS SYSTEM

By H. Higier, M.D.

Authorized Translation by Dr. Walter Max Kraus, A.M., M.D., New York

[1] The most thoroughly understood of the pharmacological substances is adrenalin, the physiological secretion of the adrenal glands and of the chromaffin tissues. Its vasotonic action has been much studied in recent years. Since its discovery it has been widely used therapeutically in infections, sepsis, nervous asthma and collapse (Gaisbock). The dose has been ½ to 1 mg. either intravenously or subcutaneously. The direct action is a rapidly beginning rise in blood-pressure due to vasoconstriction, which disappears after a few minutes either because of fatigue of the vascular walls or because of a simultaneous stimulation of the vasodilators. The rise in blood-pressure, which may be 50 per cent. to 100 per cent. of the normal, usually follows an initial tachycardia, which is followed by a bradycardia. Continuous injection of adrenalin causes the blood-pressure to remain high, but the intensity of the action depends as a rule not upon the absolute amount of adrenalin but upon the difference between the concentration of the injected fluid and the blood.

If one disregard the stimulating effect of adrenalin upon the heart one can attribute the rise in blood-pressure mainly to the narrowing of the smallest arteries. The place where the adrenalin acts is at the periphery, as may be shown on one hand by experiments in which excised pieces of blood vessels bathed in adrenalin become smaller in cross-section, and on the other by clinical observations upon cases with central paralysis of the vasomotors (traumatic injury to the cervical spinal cord, pharmacological paralysis of the bulbar centers by poisoning with chloral hydrate) in

[1] This matter should follow p. 557, June, 1917 issue; then follows the discussion of the vegetative neurology of the sweat glands (15), July, 1917, p. 69.

which the great lack of vascular tone and the great fall of blood-pressure are quite dissipated by the use of adrenalin.

The greatest action of adrenalin is upon the aortic vessels and upon the splanchnic vessels, in which the largest part of the blood is contained. By their contraction the blood is forced from the splanchnic vessels mainly into the lungs and heart. Some groups of vessels show consistent variation from the usual action of adrenalin. This is of clinical significance. Occasionally neighboring vascular regions act oppositely (tongue, lip). The heart vessels (Art. coronariæ), which probably receive their constrictors from the vagus and their dilators from the sympathetic, always dilate under the action of adrenalin; less constant in action, but usually atypical, is the action of the vessels of the brain and lungs.

The kind and nature of the susceptibility of the end-organs to the stimulation of adrenalin shows many variations. These, as has been shown above, depend partly upon the nerve tone, partly upon the irritability of the nerve-endings, partly upon the condition of the organ itself, partly upon the various conditions caused by both biological and pathological changes, changes which have been established by the general principles of modern pharmacodynamics. Thyroid extract, a vasotonic hormone, has but little effect upon the vasoconstrictors. Contrary to the action of adrenalin is that of the autonomic drugs. These stimulate the dilator fibers of peripheral blood vessels, an example of which is the reddening of the face or of the entire body under the action of pilocarpin.

The question of the relation of trophic disturbances to those of the vasomotors is not yet very clear. The trophic function of nerve tissues does not originate in specific centers or pass outward in specific nerve paths, but has its reflex path in the same path as is used by other functions.

The descending branch of this path is made up of the vasomotor fibers. Disturbances of these never lead to trophic disturbances, but to simple vascular paralysis, which leads to pathological changes in the vessel-walls only after a considerable time.

It is well known that the skin, subcutaneous tissues, muscles and bones are not equally involved in Raynaud's angiospastic gangrene. From this Phelps draws the conclusion that the above mentioned tissues have separate vasomotor-trophic centers in the central nervous system. Benders justly states that the fact that the resistance of the above mentioned tissues as well as their irritability is very unequal must not be lost sight of. It is known that stimulation of the gray rami communicantes (Langley) produces a greater re-

action in the skin vessels than in the deeper vessels. It is also known that stimulation of the vasomotor centers produces the strongest reaction in the smallest and most distant blood vessels.

Disturbances of pigmentation are found in the most varied of physiological conditions, in which local or general trophic abnormalities occur. This symptom may be found not only in Addison's disease, but also in a number of other nervous diseases (Graves' disease) in which autonomic stimulation may be assumed. Konigstein recently has shown a relation between pigmentation and autonomic stimulation by experiments upon adrenalectomized dogs and adrenalin-fed frogs.

[2] If rapidly repeated stimuli are applied there is a gradual weakening and finally cessation of the reaction (saturation or fatigue reaction). If a neighboring area of skin is now stimulated the reaction promptly recommences. The stimulation may be simply a slight folding of the skin.

It may furthermore be said that the rising of hair follicles is not necessarily associated with the production of pain and that thermic stimuli do not always bring with them the subjective feeling of cold nor always imply the presence of an anemia of the skin, as the observation of goose-flesh in febrile scarlet fever cases when either ice or heat is applied (Koenigsfeld). The reflex acts only upon the erectores, not upon the vessels, even though the vascular reflex does give some support to the other.

Section of the nerves of the skin leaves local pilomotor activity uninfluenced, which explains the fact that goose-flesh never crosses the midline of the body.

There is also smooth muscle in the tunica dartos and in the nipple, which contracts in sexual excitement. Of more importance in this connection is the smooth muscle in the skin of the penis which is innervated and made to contract and relax simultaneously with the muscles of the erectile bodies (vasoconstrictor fibers) by means of the dorsalis penis nerve. This coördination plays a considerable rôle in the mechanism of erection and of detumescence caused by cold and the action of unpleasant emotional states.

What has been said of the antagonistic innervation of the sweat glands may be applied to the pilo-erector muscles. Upon anatomical grounds they are only innervated by the sympathetic, while upon pharmacological grounds (intravenous injection of adrenalin) they seem to be innervated by the autonomic.

Among the rarities found in human pathology may be mentioned

[2] This paragraph should follow on matter on p. 73, July issue

the "trichopilous" crises of tabetics (Neumann) and the unilateral crises of hemicrania (migraine) Féré).

As to the psychic influence upon pilomotor nerves, this much may be said; that it is quite strong. Goose-flesh with a feeling of cold may be produced by very lively suggestion of general or unilateral cold as well as by certain unpleasant sensations, as scratching upon a slate table or a pane of glass or grinding of teeth. It may also be associated with intense emotional states, ecstatic or depressive.

17. Endocrinous or Internal Secretory Glands

A few words must be said at the close of our observations concerning the mutual relations between the vegetative nervous system and some of the glands of external and internal secretion and of digestion. This subject will be discussed only in those aspects which have not been emphasized in the general section or in the sections on special organs.

The important physiological conception of the significance of the circulation of the blood in the body has led to the knowledge that this phenomenon serves, among other purposes, that of the exchange of the nutritional and waste products of the body, and that of giving the material for the special secretions of those organs which receive their stimuli to activity from the nervous system. But it has also been discovered that in addition to activation by the nervous system, there is an activation by means of substances circulating in the blood. These substances act directly upon specific organs, or influence their reactivity by acting upon their nerve supply.

The proof that these substances or hormones give the specific stimulus was obtained by finding the same results after as before section of the nerves to the organ.

We have on the one hand organs which have a rich blood supply, but no external means of emptying their secretions, and which supply substances directly to the blood, while on the other hand we have organs which, though they do the same thing, have also an external secretion. These are the testicle, ovary, pancreas, stomach and liver.

Under special conditions, hormone production may be influenced by the nervous system, as, for example, in the "piqûre."

As Köhler has justly observed, we must conceive of all hormones as being constantly produced, and as being constantly present in the blood stream. Further that they all have an influence upon each other so that there exists in the healthy body an equilibrium between their stimulating and inhibitory effects, *i. e.*, a normal hormone tone, a balance whose maintenance is one of the most delicate chemical

arrangements of the body. If the normal amounts of hormone act as physiological stimulants, we may readily see that disease in any of the organs producing them will cause a dystrophy. There will ensue a production of too much of the hormone (hyperfunction), or of too little (hypofunction). Following soon upon this disturbance of one gland, there will come a disturbance in the functions of several glands, since, as we have seen, the individual glands are mutually related in the rôle of stimulators or substitutes of each other. Thus we get a condition of polyglandular dystrophy.

A roughly schematic division of the glands according to their effect upon metabolism follows:

1. Acceleration: Thyroid, Hypophysis, Adrenal, Sex Glands.
2. Retarding: Parathyroid, Pancreas, Thymus.[3]

The first group stimulates the sympathetic, the second inhibits it, facts which may be observed in all conditions of hyper- or hypofunction of the glands.

It has been found in metabolism experiments that protein, fat and carbohydrates, as well as many mineral substances, especially calcium, are correspondingly affected (Fr. Müller).

The large glands of the abdominal cavity which, as has been stated before, have innervations analogous to that of the gastrointestinal tract are: the liver, pancreas, adrenals, and kidneys.

(*a*) The liver and pancreas, glands of the utmost import to the body economy, are the only two which the vagus stimulates, the sympathetic inhibits. Without going into the action of adrenalin,

[3] *Translator's Note.*—Falta, in his new book "Die Erkrankungen der Blutdrüsen," 1913, gives the following classification:

1. Accelerator [catabolic-dissimilator].
   - (*a*) Thyroid.
   - (*b*) Hypophysis [posterior lobe].
   - (*c*) Chromaffin Tissues.
   - (*d*) Sex Glands.
2. Retarding [anabolic-assimilator].
   - (*a*) Parathyroids.
   - (*b*) Hypophysis [anterior lobe].
   - (*c*) Cortex of the adrenals.
   - (*d*) Interstitial glands.
   - (*e*) Thymus.
   - (*f*) Epiphysis.
   - (*g*) Pancreas [islands of Langerhans].

Falta states that the thymus and epiphysis probably belong in group 2, the retarding group. As to the pancreas, he says, speaking of group 1: "We may contrast with this group [1] the group of glands [2] with retarding or anabolic, or assimilator hormones. To it belongs the insular apparatus of the pancreas . . . , and further, the parathyroids, etc., etc."

cholin and cocaine, we may say that the effects of the "piqûre" in the floor of the third or fourth ventricle may be explained as a result of an injury and stimulation either to the vegetative midbrain tracts or to the dorsal vagus nucleus and its visceral fibers to the liver. There is no doubt of the secretory influence of the vagus. In the chapter upon vagotony, the glycosuria and glycemia of liver diseases have already been discussed.

The spinal cord origin of the nerve fibers for the liver is, according to Hallion, from $D._6$ to $L._2$.

(*b*) The pancreas reacts to the paralyzing effect of atropin upon the vagus, quite like the other salivary glands.[4] The pancreas, like the parotid, yields secretions with varying content of ferments and of varying concentration, according to whether the vagus or the sympathetic fibers are stimulated.

The functional antagonism between the pancreas and the chromaffin tissues, so generally emphasized, has not as yet been conclusively demonstrated. But, as Lubarsch states, we at least may say that the manifestations of a loss of the function of the pancreas are like those of stimulation of the chromaffin system. Whether there be an internal relationship between these two is still entirely unknown. It has not been shown that there is a hyperadrenalemia or any increase in the chromaffin tissues in the body after the pancreas is removed. This would be the least which would have to be shown to make it probable that after loss of the internal secretion of the pancreas a state of hyperfunctioning of the adrenals would follow.[5]

The relation between diseases of the pancreas and diabetes cannot be considered as being cleared up, since we have come to know of hepatogenous and neurogenous glycosurias as well as glycosurias of other origin, in addition to that due to disease of the pancreas. This is especially true since we have been compelled to give up the idea of some functional disturbances of the pancreas without morphological bases. The readily demonstrable changes in the intertubular cell-groups of the pancreas, such as severe injury or atrophy, lead

[4] *Translator's Note.*—It must be remembered that the Germans speak of the pancreas as the abdominal salivary gland, "Bauchspeicheldrüse."

[5] *Translator's Note.*—It has been shown by Pemberton and Sweet (Arch. Int. Med., Vol. 10, No. 2) that removal of the adrenals causes a flow of pancreatic juice which may be inhibited by injection of epinephrin, and that this inhibition wears off with the wearing off of the effects of the epinephrin, though more slowly. Whether this be due to vasoconstriction affects, or to some other less understood relations, the authors do not wish to say. However, there is here evidence of a close relation between these two glands.

to diabetes. These cell-groups have been designated islands of Langerhans after their discoverer, and are supposed to yield the internal secretion of the pancreas. Their embryology is as yet obscure. Yet pancreatic diabetes has thus gained a definite pathological basis, which was unknown for many years.

Disease of the pancreas, due to a disturbance of its internal secretion, may, according to M. Cohn, lead to a group of severe symptoms of an autonomic nature. These are exophthalmos, v. Graefe's, Moebius and Stellwag's signs, lymphocytosis, phloridzin glycosuria, dermatographismus, etc.

(*c*) The kidney receives sympathetic vasodilator and secretory fibers from the lower dorsal roots, while, on the other hand, it receives fibers from the vagus which inhibit secretion. The polyuria resulting from "piqûre" is, in all probability, due to a paralysis of the kidney fibers from the vagus nucleus, which ordinarily have an inhibiting action, and whose influence is thus removed.

(*d*) Proof of an internal secretion of the adrenal glands has been obtained by Ascher, by removing all the abdominal viscera except the adrenals, under which conditions, stimulation of the splanchnic nerves will cause a rise of blood-pressure. If the adrenal veins are clamped, this rise will not occur. Lasting nervous stimulation will cause adrenalin to be continuously produced, with effects the same as caused by intravenous injections. Thus, it has been shown that, under physiological conditions, an internal secretion of the adrenalin into the blood takes place.[6]

Some cases of diabetes may be due to over-stimulation of the secretory nerves to the adrenals, whereby an increased supply of adrenalin with ensuing glycosuria results.

In favor of this idea are the facts, stated by Ascher, that the sugar "piqûe" is only active when the adrenals are present, and that emotions may cause an increased secretion of adrenalin into the blood. The fact that adrenalin glycosuria may occur after bilateral splanchnicotomy, and the fact that nicotine cannot produce this, lead Polak to the conclusion that adrenalin itself has a stimulating effect upon the sympathetic nerve endings in the adrenals. All substances which excite the sympathetic, as cocaine and paralde-

[6] *Translator's Note.*—As to the amount of this secretion, Hoskins and McClure (Arch. Int. Med., Vol. 10, No. 2) have shown that normally not enough is produced to influence the sympathetic system, and thus to be a factor in maintaining its normal physiological tone. Only stimuli of exceptional nature will cause enough adrenalin to be produced to affect the sympathetic endings.

hyd, and all substances which have inhibiting effects upon the sympathetic, as quinine and salicylates, will also inhibit adrenalin glycosuria.

According to Frank, the relations of the chromaffin system to diabetic metabolism, as well as to the high blood-pressure of renal disease, are entirely hypothetical.

What practical rôle the function of the adrenal plays in vagotonia as far as the genitalia are concerned is indicated by the following. In cases with atony of the gravid uterus with consequent inversion or with uterine hemorrhage of doubtful etiology it is usually found on autopsy that the chromaffin system is hypoplastic. In chronic interstitial nephritis a hyperplasia has been found (Neusser, Wiesel). Should physiological adrenalinemia be reduced, due to insufficiency or poor nutrition of adrenals, we may expect to find a decreased tone in the sympathetic nerves to the uterus. If we consider the facts that synthetic adrenalin is less toxic than natural adrenalin and that cocaine increases the reactivity of nerve endings to adrenalin, we may well understand the value in cases which threaten to develop a severe uterine atony and in which natural adrenalin is diminished, of an injection into the uterine musculature of a mixture of synthetic adrenalin and cocaine, or the use of pituitrin or hypophysin, which does not stimulate the uterine nerves, but increases their reactivity.

During the short period of the development of our knowledge of the chromaffin system so many valuable physiological and diagnostic points have been revealed that we may justly await with great interest and expectation the further elucidation of this yet to be completed character of visceral neurology.

(*e*) The thyroid, to which frequent reference has already been made, stands in very close relation to the chromaffin system. The hormone of the thyroid, discovered by Baumann, iodothym, has been shown by Oswald to be a combination of two substances, iodothyreoglobulin, containing iodine, and a nucleo-protein, not containing iodine. Of physiological import is the fact that the iodothyreoglobulin has not only an antagonistic action towards some, synergistic action towards others of the hormones, but also has a great influence upon fat and general metabolism. The gland is a supporter of the adrenals in opposing the pancreatic hormone. The last hormone hinders the organism from being inundated with sugar. When it is absent, its antagonists take the upper hand, whereby the hormone of the adrenals causes a great increase of the sugar in the body, and the hormone of the thyroid causes a great increase in the

burning of fat, and in the protein destruction. This occurs even in starvation.

According to many authors (Frank) the relationship between Graves' disease and the sympathetic system is such that the hyperthyroidism stimulates the sympathetic. Thus, the nerves to the adrenals would be stimulated, and adrenalin production would ensue. According to other experimenters (Bauer) Graves' disease is a secondary manifestation, an "internal secretory neurosis," dependent upon increased irritability of the vegetative system.

The clinical pictures of hereditary and congenital hypofunction of the thyroid, as cretinism, myxedema, and of hyperfunction of the thyroid (Graves' disease) are well known, and cause the same manifestations which are produced by paralysis or stimulation of the sympathetic and autonomic nervous system. The behavior of the blood in dysthyreodism is noteworthy (Kocher). In Graves' disease and myxedema there is a percental and absolute decrease of the leucocytes and an increase in the lymphocytes. In Graves' there is a decrease in the coagulability of the blood, while in myxedema there is an increase. Even if the exact etiology of this disease has not been universally shown to be thyreoid, yet the great majority of authors believe it to be such. The conception that the disease is purely a sympathetic disorder unrelated to other causes is more clearly explained by the theory of a hormone, since this also produces a great many symptoms which may be traced back to the sympathetic. These are v. Graefe's sign, widened lid slits (Stellwag's sign), diarrhea, exophthalmos, tachycardia, sweating. Yet the etiology for these, if this similarity of manifestations be adopted, may be ascribed to the activities of the thyroid hormone.

The influence of the thyroid upon carbohydrate metabolism has been discussed above. The alimentary glycosuria so frequently found in Basedow's disease may be explained either by an increased inhibition of the action of the pancreas by thyreoido-globulin or, what is more probable in view of the adrenalemia, by an increased adrenalin action.

As to the relation of diseases of the thyroid to other endocrinopathies, it may be noted that the changes of the blood—leucopenia or leucoanemia with absolute or relative mononucleosis, eosinophila and diminished coagulation time—are also found in other endocrinopathies when these are combined with status thymico-lymphaticus (Borchardt) since this is the principal cause of the blood changes. According to Wolfsohn, the same blood picture is characteristic of anaphylaxis, and in this condition vagotonia is

demonstrable. In view of this, Wolfsohn thinks it not improbable that the thyreosis is an anaphylactic phenomenon. The foreign proteid in these cases would be an excess of some albumin containing iodine and secreted by the thyroid.

Cushman has recently tried to explain the causal relationship between Basedow and vago and sympathicotonia by assuming an intermittent form of Basedow (without struma) which is associated with other severe vegetative symptoms as paroxysms of bronchial asthma and tabetic-like abdominal crises due to high blood pressure. The Basedow symptoms in tabes, in this way, may be regarded as disturbance equivalent to vegetative system symptoms, *i. e.*, as a symptomatic Basedow with tabes as the basis, causing tabetic affections of the vegetative nervous system (Malaisé), which causes thyreotoxic symptoms.

The theory of Gottleib, that thyreotoxin sensitizes both parts of the vegetative nervous system for the action of adrenalin, is of value in connection with the vago-sympathetic form of Basedow's disease which, as we have seen above, is often complicated by psychic symptoms.

A gland of internal secretion, whose influence upon the vegetative system has been discovered in the last few years, deserves mention in closing. This gland is the paired parathyroid or glandulæ parathyroidæ. In the course of our discussion we have mentioned this gland not only in the general part in speaking of pharmacological matters and of the influence of endocrinous glands upon the mind, but also in the special part in speaking of metabolic anomalies and vegetative neuroses resultant upon some disturbance of the endocrinous glandular equilibrium.

It is well known through both clinical observation in thyreoplasia and experimental researches upon parathyroidectomized animals, that the absence of the parathyroids and the accessory parathyroids is responsible for tetany in its most various classical and abortive forms. These are tetany in children, in workmen, in gastric disease, in acute infections, during various intoxications, in pregnant women, during parturition and in post-partem cases, in nervous diseases, after operations in the cervical region, etc. The pathologico-anatomic basis of all of these forms of tetany is supposed to be an organic or functional disturbance of the normal activity of the parathyroid glands.

(*To be continued*)

Periscope

The Psychoanalytic Review

(Vol. III, Nos. 1, 2, 3, 4)

Abstracted by Louise Brink, New York

1. Symbolism. W. A. White.
2. Technique of Psychoanalysis. S. E. Jelliffe. (Continued from Vol. II.)
3. The Work of Alfred Adler, Considered with Especial Reference to that of Freud. J. J. Putnam.
4. Clinical Cases Exhibiting Unconscious Defense Reactions. F. M. Shockley.
5. Freud and Sociology. E. R. Groves.
6. The Ontogenetic against the Phylogenetic Elements in the Psychoses of the Colored Race. A. B. Evarts.
7. Discomfiture and Evil Spirits. E. C. Parsons.
8. Two Very Definite Wish-Fulfilment Dreams. C. B. Burr.
9. Art in the Insane. C. B. Burr.
10. On Somnambulism. L. Grimberg.
11. Retaliation Dreams. H. Crenshaw.
12. Critical Review: Frazer's Golden Bough. L. Brink.
13. Critical Review: "Sons and Lovers": A Freudian Appreciation. A. B. Kuttner.
14. Translation: The Significance of Psychoanalysis for the Mental Sciences. O. Rank and H. Sachs. (Continued from Vol. II.)
15. Translation: Processes of Recovery in Schizophrenics.. H. Bertschinger.
16. Translation: The History of the Psychoanalytic Movement. S. Freud.

1. *Symbolism.*—A summary glance over a variety of common symbols reveals that symbolism is a matter of everyday useage and not confined to special forms of artistic or religious expression. The necessity of this mode of expression, White shows, arises from the process of unremitting change in the history of thought with which concepts and the words which express them are forced to keep pace. The former is fluid, the latter are static, so that the result is "a compromise between the tendency to stability, conservatism of the form, and the constant tendency to change, the fluidity of the meaning." White gives examples illustrating this course of development in the extension of word meanings and in certain important concepts. It is a fundamental principle that anything may be used as a symbol, but the choice is of course limited by the mental content of the person who uses it. It may vary in meaning with the time of its use and the subject using it, while its manifestness is in direct proportion to the limitation of the apperceptive mass. This implies concreteness of expression, which belongs to the early form of thought of child and primitive man. There is a persistence of old symbolic forms even when their original use has been crowded out by the expanse of the apperceptive mass. The symbol is thus first a direct representation, then a symbol of the abstract, an ideograph, which in turn is left with only a mystical meaning, and loses even this to become an ornamental device.

Symbols which belong to the fore-conscious are easily understood, but it is the unconscious idea or anti-social tendency which must express itself in

a distorted and thus unrecognizable symbolism. It is the resulting compromise between the pleasure-pain and the reality motives, between the emotional trend of the unconscious and the conceptual and ideational content of consciousness. Ferenczi, the author says, would limit the use of the word symbol to those likenesses one member of which is in the unconscious, which is of course the symbol of especial technical interest to the psychoanalyst. The uncritical attitude of the unconscious permits of an easy use of analogy, even to the point of an extensive identification, a phenomenon explained by the energic concept of a shifting libido. This concept also reveals the symbol as an expression of ourselves, as an end product of all that has gone before, which is preserved in the unconscious, where we are near to the intuitional reality of things. Development has individualized us but the symbolism of the psychotic, who expresses his psychic elements through objects about him, shows his return to the earlier plane of undifferentiated relation to environment.

Since the sexual is the oldest avenue of libido expression and because of its reproductive necessity the most deeply grooved channel, it becomes most easily the path for reanimation by the introverted libido of the neurotic. Hence the sexual character of neurotic symbolism in thought and dream. The libido can here find expression only upon this earlier level even while the concrete symbolisms contain the effort to escape this bondage to the sexual. The interpretation of symbolism involves an appeal to the individual's experience and psychical limitations, and yet on the other hand the universality of unconscious symbolism makes it necessary to have a general interpretation to reach the meaning which becomes more universal the deeper it lies in the unconscious, where it belongs to the ontogenetic and phylogenetic past. There are three levels of animal and human reaction, the oldest being the physico-chemical, in which certain factors such as the chemical regulators of metabolism act as transmitters and transmuters of energy. The sensorimotor system has also its agents. The highest, the psychic level, must employ symbolism for this purpose. The symbol not only serves thus because of its wide latitude of usefulness, but because it can likewise transmit energy from a lower to a higher level, as, for example, money in its employment from the crudest to the most highly developed systems of interchange, or the symbol God, which has brought energy from the crassest anthropomorphism to the most abstract and abstruse conceptual development. It is the symbol alone that has possessed that capacity for variability which made possible continued advance in control of environment. It is the symbol alone also which can be considered at the complex level of conscious thought, where the stereotyped character of the other carriers of energy make them no longer available. Ultimately from the principles of development these symbols must all have their root in the unconscious. Such an energic conception of the psychical activity with its transmutations of energy tends, therefore, to break down the artificial barrier between mind and body.

2. *Technique of Psychoanalysis.*—Jelliffe applies here his previous consideration of the various libido trends in their effort after self-expression, power, to the practical psychoanalytic procedure. This involves above all the question of the "transference." In the correct management of this factor, he says, lie "the dynamics of the entire psychoanalytic situation and the possibilities of cure by its application. Transference, like other dynamic principles, escapes definition. An adequate understanding of it, however, must center about the nature and aim of the libido striving. The psychoanalytic point of view posits the instincts of reproduction and self-preservation as the essential and fundamental symbols underlying life and all other so-called instincts as products of these. Concrete immortality, directly through offspring or indirectly through social structures, is the goal of libido striving.

Potency is therefore the ideal and impotency leading to death is its opposite. Fear is the symbol of the one as desire is of the other. Hall's discussion of fear is quoted to show its action in stimulating to output of energy to secure power and escape impotency and death. Chief among fears, therefore, is the concrete thanatophobia or fear of death. The physician thus becomes in a supreme way the projected wish of the individual unconscious, as of the community, to ensure continuance, and protection from disease. Each patient, through the physician's sympathetic insight, identifies himself with the physician as a part of himself, as the former stands in the place of the parent image which afforded security in infancy. Thus even the most purely medical treatment rests fundamentally on this element, for the psychogenic is present in every case. The physician is constantly used as an unconscious symbol for the security which will abolish death, physical, financial, social. As Hall says, "there is a sense in which all fears and phobias are at bottom fears of death or of the abatement or arrest of vitality, and also a sense in which all desires and wishes are for the gratification of love. The one is the great negation, and the other the supreme affirmation of the will to live."

The transference, therefore, starts very deep in the unconscious at the most primitive libido foundations. It is represented in Adler's attempt to get into a genetic conception of disease. He recognizes that human evolution depends largely upon the effort of the individual to evolve to a higher form through a supreme effort to effect a compensation for unconscious psychical inferiority evolved from organic inferiority. Compensation, however, has its limits and when it breaks down anxiety results with loss of values and phantasy substituted for reality. The neurotic patient finds the security he is seeking in the parental image and seeks this revived in the physician.

The understanding and watchful utilization of this dynamic factor has been discussed by Freud. The importance of the dreams, particularly the first ones, for estimating this factor in a patient is illustrated by certain dreams which Jelliffe reports from his own experience. He refers to the importance of the negative types of transference also revealed in the dream as evidence of not making ground in the analysis. The patient is turning expectantly to find security and satisfaction for the energy which has not found its socially valuable release, "free floating libido."

Jelliffe compares his experience in regard to the transference with Freud's discussion of it. He, like Freud, finds it in evidence as an active factor in all forms of therapy and its features not the product alone of psychoanalysis. The inevitable resistance which arises out of it lies in the nature of the neurosis, for it consists in the fact that the libido has entered the path of regression and all the forces which originally caused the repression and the return to this path will naturally arise against the effort of psychoanalysis to search out the libido and bring it back to reality. The strong attraction of the unconscious, which prolongs the disease even when the original cause of the turning from reality is no longer active, must also be overcome. The very transference is utilized to occupy the physician and divert him from the pathogenic complex, and the transference becomes the strongest weapon of the resistance, which expresses itself in the intensity and persistence of the transference. The latter then becomes the object upon which the physician must work in order to lead it back to the infantile occupation of the libido which has made the transference possible. It must be considered in its positive and its negative phase. The ambivalence of feeling which belongs to the unconscious determines this twofold transference phenomenon. The whole psychic "struggle between physician and patient, intellect and instinct, knowledge and desire for action, plays itself out almost exclusively in the transference phenomena, and here lies the final cure.

The strong positive transference presents serious pitfalls, as the patient

manifests a strong unconscious attachment. The physician has to avoid yielding to the patient's desires and at the same time beware of making a sublimated ethical demand for which the patient is not yet ready. The transference creates an inevitable responsibility for the physician, who must meet it by leading the patient through the trust and affection involved to the task of getting well and of finding adequate outlet in reality. "The love is to be freed from its infantile fixations, not in order to be expended in the course of the treatment but to be preserved for the demands of real life for which the treatment is preparing the patient." Many small signs to be constantly observed reveal the positive transference. There are likewise many indications of the negative transference. Coming late, losing dreams or other written material, apparent sudden cure, voluble speech, excessive abundant dream material are some of the classical signs. Inquisitiveness about the physician and his family, criticism of the home, of the manner of the servants manifest the same. There is also endeavor to throw upon the physician control of the patient's external affairs, failure in which would bring reproach upon the physician. In all this Jelliffe compares again his experience with citations from Reik upon this subject. A bitter and persistent resistance is likely to follow a transference quickly and easily established at first. A certain amount of friction from the beginning makes the analysis run more smoothly on the whole. There are sometimes outbursts of anger against the physician or a third person involved, perhaps another physician or a fellow patient. Free treatment is especially conducive to resistance reactions. Sometimes there is a condition of "haughty obedience" where the patient will slavishly follow the physician but without any self-independent adaptation to actual conditions. The final, difficult resistance is the one against the ultimate doing away with the transference. At the same time the manner of first receiving the patient's statement of his illness will at once make for a positive or a negative transference attitude.

The physician must be on guard to recognize and adjust his own negative transferences which are roused during the course of the treatment. Reik speaks of three chief components upon which the resistance is based, the narcissistic which relates to the disturbance of the ideal ego structure, in which the physician revives the father attitude of censor; homosexual currents which are roused through the transference toward the physician and the anal erotic tendencies so closely bound with the neurotic restraining and repressing of affect.

The author calls attention to the danger of substituting a criticism of former practitioners in the patient's experience or of fellow analysts for a lack of understanding on his own part of the revelations in the dream concerning former relations and failure to eliminate his own infantile fixations from interference with the success of the treatment.

The neurotic, according to Ferenczi, is constantly in search of an object upon which to transfer his feelings, one which can be drawn into his circle of interest, "introjected" in contrast to the paranoiac mechanism of projection. Introjection is a self-attempt at healing. Met by a well-disposed physician it works for a cure. This transference is only a partial means to success, however. The patient must through analysis overcome resistances which prevent his self-knowledge. Ferenczi's presentation of hypnotism in this connection is freely quoted. Psychoanalysis has given such an insight into the mental processes concerned in hypnosis that the conclusion seems inevitable that "the chief actor is not the hypnotist or the person offering the suggestion but the patient himself, who has hitherto been looked upon as merely the object." Dissociation has been discovered as already present in the existence of different layers of the mind. Psychoanalysis has revealed, besides, the content of idea complexes, the direction of the affect, and prominent

among the complexes the parent complex. This latter, lying at the foundation of the transference phenomena, has been the important factor in establishing the individual's susceptibility toward hypnotic or suggestive influence. Hypnotists have unconsciously adopted the parental rôle in bringing about the hypnotic state, either through the sternness of the paternal attitude or through the gentle, soothing manner of the mother. The suggestibility of the hypnotic state depends upon the primary, unconscious erotic wish-impulses which are ready for the transference upon these representatives of the parents, the first love objects. This suggestibility is not analogous to the infantile character, it rather discovers the infantile character still existent in the unconscious of each adult. Resistances arise toward hypnotism just as toward fuller psychoanalytic treatment. These may lie in unwillingness to have unconscious erotic pleasure disturbed or in an antipathy to the physician arising out of the unconscious infantile complexes, or in other feelings traceable to the parent complex.

3. *The Work of Alfred Adler, Considered with Special Reference to that of Freud.*—Putnam calls attention to Adler's work in this connection for two main reasons. In the first place, interesting and brilliant as this work is, Adler's attitude of supplanting rather than supplementing Freud has prevented the utilization of his conceptions, which otherwise might have followed. On the other hand Adler's mode of explanation is only too attractive to those who seek to adopt a more palatable but less complete expression of the truth which Freud has fearlessly enunciated.

The author reviews briefly Adler's two most important writings. The first is the monograph which develops the stimulating and suggestive but not sufficiently established thesis of organic inferiority[1] in which Adler finds as a chief cause both of disease and of favorable evolution the relative defects or functional inferiorities present in one or more organs of the body and in the reactions of these organs against the defects. Either other related organs may become involved and the organism fall victim to a series of diseases pertaining to them or there may be a second outcome in "compensation" or "over-compensation." The inferior organ is embryonic in its character so that there is possible a great variety in development. The sex organs and the nervous system are peculiarly liable to a secondary involvement in consequence of the inferiority. The mental development of the individual is so affected that it offers opportunity for the occurrence of the neuroses and psychoses. The intensification of the protection with which the mental functions here intervene manifests itself particularly where the organ comes in contact with culture and here the processes of repression begin. The inferior organ he believes to be particularly prone to be a pleasure-organ and adverse to educational culture. Adler agrees thus far in the main with Freud's observations, but he indicates his divergence in finding the psychical phenomena characteristic of the psychoneuroses in this attitude of the patient due to the influence of the inferior organs, in all of which he manifests his tendency to follow but one scent and leaves out of consideration the emotional causes of these phenomena. He fails to take account of a positive impulse toward something better as the source of progress and not merely the instinct to escape from evil or failure. Rather the recognition of the latter arises out of the higher impulse.

The second book, The Neurotic Constitution,[2] reveals the same merits and defects as the first, but with more serious opposition to the work of Freud and his colleagues. He not only fails to establish sufficiently the advantage

[1] Study of Organ Inferiority and its Psychical Compensation. Monograph Series, No. 24.

[2] Moffat, Yard & Company, 1917.

of his viewpoint over Freud's generalizations but does not see and acknowledge that he is merely restating propositions which had already been covered by Freud. The underlying idea is based on the individual psychology of the neurotic as a sole criterion for study. The instinctive craving to escape from weakness and attain a sense of superiority and security through phantasy, through any strategy or double-facedness is the controlling impulse, but any other principle of progress seems to be ignored. The creative energy inherent in the individual as well as the influence upon him of his particular social environment does not come into Adler's account, while those factors upon which he does dwell have been recognized and carefully worked out by Freud.

Further, his "neurotic goal-seeking tendency" is an inadequate substitute for Freud's "libido," the discarding adoption of which in place of the latter discards also the sexual origin of the repressions. Sex ideas and symbolisms he makes only a form of speech for the "will to power." This neglects the fact that sex-language owes its universality and primary character to reproduction as a law of life both in biology and even in thought. Adler emphasizes one mode of mental manifestation instead of finding a unified basis of the manifold phenomena which Freud has discovered in his studies in regard to the infantile wish. In this way he offers a temptation to those who would evade Freud's profound entrance into the sexual problem and therefore would break off an analysis at the very entrance point into its fundamental meaning, which is basic to any study of other individual psychical elements. Adler's attitude, therefore, although that of a keen analyst, by no means attains to Freud's faithfulness of observation and clearness of vision, which enable him faithfully to reproduce the truth.

4. *Clinical Cases Exhibiting Unconscious Defense Reactions.*—Shockley shows through a number of illustrative cases how the interpretative work of psychoanalysis reveals the close relationship of abnormal psychic reactions, whether merely those of everyday life or actual psychotic manifestations. They all serve the common purpose of defense against unacceptable environmental conditions involving experiences at the biological levels or in the realm of conscious ethics. Unconscious mechanisms are then adopted which permit a compromise through symbolic gratification on the one hand and prevention of conscious recognition of unconscious needs on the other. The character of the resulting symptom depends upon the degree of disturbance of the biological functions and the emotional value of the inciting cause. Thus the first cases given by the author represent defense reactions common in ordinary life as reactions against experiences which are not deep or which have had an almost sufficient discharge. Others are pathological with a heavier load of emotional experience but the interference of the resulting symptom with normal functioning is only temporary. Still other cases exhibit a defense against almost unchangeable conditions which are deeply emotional and the derangement is more or less permanent. The unity of all these is manifested not only in the purpose but also in the lack of any definite line of demarcation between them.

5. *Freud and Sociology.*—Groves calls attention to the failure thus far on the part of sociologists to recognize the social import of Freud's psychology. Freud and his followers have not neglected its significance in this sphere. Their dynamic and individualistic psychology which aims to explain human conduct upon the basis of mental conduct has already given valuable information to the sociologist which cannot continue to be ignored. The emphasis upon the sex element in its psychical even more than in its physical aspect and its fundamental place in human life is of utmost significance, particularly as it reveals a knowledge of the process of sublimation and its meaning for society. Freud's investigation of the dream as a wish-fulfilling product also places in the hands of the sociologist the means of discovering

the underlying human motives. Likewise the interpretation of myths which traces them to the primitive wish of the human mind is of great sociological value as it aids in the understanding of human action and especially of religion. The theory or reality and the conflict between the reality principle and the pleasure-pain principle which governs the unconscious is also especially applicable since social progress is dependent upon reality thinking. Freud has expected opposition from society because of the criticism which psychoanalysis must make that social repressions are in large part responsible for the neuroses. Yet Freud also admits that repressions are necessary defense reactions and that the neuroses themselves have a biological function. The sociological aim, however, should be to release the energy bound in these neurotic symptoms and turn it to a more truly productive use in a more truthful and worthy state of society.

6. *The Ontogenetic against the Phylogenetic Elements in the Psychoses of the Colored Race.*—Instances of the various symptomatic activities of the mentally deranged which Evarts gives are referred to phylogenetic memories, the reaction patterns which were laid down in the earlier history of the race and which appear as outcrops, "isolated peaks . . . above the smooth sea of ordinary life and convention enveloping the rugged mountains built of the age-long life of humanity." The apparently absurd mechanisms of these patients the author traces back to definite ceremonies and organized activities once carried out by the race with a definite purpose and to the beliefs which were potent factors in the past history of the race. It is the colored patients who reproduce these things with greater completeness, since these elements are with them still individual rather than purely racial memories. Evarts then reproduces an account of certain of these magic beliefs and the magic performances to which they led in order to avert evil supposedly induced in the same way. These were furnished by a colored prisoner of the criminal rather than the insane type, in whose life, or belief at least, they had been important factors. They illustrate the survival of the principles of magic in this race still so near their savage origin and at the same time the individual adaptation of the means at their disposal of fitting these principles to the modern conditions in which the negro is placed here in the midst of the white race. The given account manifests not only the survival of the phylogenetic inheritance but the actuality of these beliefs and practices still for the individual who has not sufficiently advanced to dispense with such psychical aids and supports.

7. *Discomfiture and Evil Spirits.*—Parsons suggests that the psychological interest which is being turned upon ethnology may well find a fruitful field in demonology. The fear of demons seems to have its origin in dread of approaching crises which call for new adaptations. Hence certain ceremonials which act as shock absorbers, such as initiation ceremonials at puberty, superstitious ceremonials and customs at mating times, weddings, during pregnancy connected with parturition and at death. So that it is to the feeling of apprehensiveness and discomfiture that evil spirits owe their origin.

8. *Two Very Definite Wish-Fulfilment Dreams.*—This is a brief report of two of the author's own dreams which reveal through their condensation of several factors from his immediate and earlier experience wishes which were prominent in regard to his personal life and work.

9. *Art in the Insane.*—The author of this paper says in an introductory abstract: "Pictorial art of the insane is very largely representative of emotional states and complexes. It is frequently erotic, has to do with primal instincts, and, among those who have pursued art study, is often subtly symbolic." He then proceeds under the psychoanalytic principle that every expression in word, movement, every bit of jargon or incoherence, even, has

its motivation in a complex or momentary state of feeling and is a response to the environment or to some deep-lying suggestion or symbol forcing itself to the surface. In the light of this principle he offers the artistic work of certain patients. The numerous heads of kings and queens in the drawings of one patient are further interpreted as revealing her erotic complex by certain more clearly expressed jingles. Another represents her far-reaching struggle over an unsatisfactory marriage in graphically written sentences, in numerous heads and designs, the latter ranging through the human, the conventional and the cubist and all highly symbolic, with a repeated symbolism which reiterates her complex and attitude toward it. A third patient represents in striking manner, which contains architectural arrangement, archaic reference, ecclesiastical allusion, anatomical drawing and what not, the beginning of things as well as features of his present external complex with reality. Still another represents in the crude symbolism employed erotic features which have been repeated also in certain masochistic acts.

10. *On Somnambulism.*—Grimberg refers to the merely speculative or descriptive discussions of somnambulism which have preceded the interpretative psychoanalytic approach to this subject. The latter attempts to find a rational and logical basis for the phenomenon and to assist the subject to a better foundation for reaction. For the two cases cited, one from Sadger's experience and one from the author's own, reveal the somnambulism to be a form of reaction which carries out a "subconscious" wish. The first case is founded upon a child's experience with his mother which the somnambulism sought to repeat; the second case repeats an experience of fright, the unconscious pleasure motivation of which was inaccessible on account of the mental grade of the patient. Somnambulism seems to occur when the sleep is not deep and reveals the carrying out of reflex and involuntary actions while conscious activity is abolished, but with a purpose and control which is psychical and unconscious. In this way it differs from a purely physically stimulated activity of the inferior centers of the nervous system.

11. *Retaliation Dreams.*—Crenshaw offers a number of dreams in which the element of spiteful retaliation denied by cultural society is strongly in evidence. The dreams express the true universally unconscious desire to be even with an opponent of whatever sort, when in conscious life there had been a partial and sometimes apparently satisfactory acceptance of the unwelcome situation. The desire for revenge the author considers as a deep-seated psychic impulse apart from the sexual and therefore deserving of special consideration in dream study.

12. *Critical Review: Frazer's Golden Bough.*—The author has presented here an appreciation of Frazer's encyclopedic volumes on racial customs and beliefs as a work in comparative psychology analogous to such a compendium of material for comparative anatomy or embryology. It's value for psychoanalysis is shown to lie in the recapitulation principle by which such a study becomes a source of understanding of the unconscious life of the present in the light of its record largely in the making, for such the Golden Bough is in fact. A brief outline of the theme of magic belief and the ceremonies and customs to which it has led, as Frazer has developed it throughout the volumes, is first presented with reference to the impressive quality of Frazer's thought and expression of it. This is followed by an analytic comparison of the various libido trends which are found surviving in the unconscious of the individual of to-day with these same libido manifestations in earliest existent races and upward through slow development into customs and beliefs which are still found in civilized countries. They represent unconscious trends which belong to mankind in their historical setting when they were facts in the conscious life of man and were only gradually taking their place in the unconscious past.

13. *Critical Review: "Sons and Lovers": A Freudian Appreciation.*—Kuttner points out the striking manner in which this special piece of artistic literature grants confirmation to Freud's theory of the evolution of the love life out of the original attitude toward father and mother. Such an expression in art proves to us a theory as an authentic part of life. The author then analyzes briefly this novel in which the hero Paul, born out of the mother's hatred toward the brutal, sensuous father, brought up in hostile fear toward him, gives to the mother even in childhood an absorbing love which continues of a lover-like character and preserves in him an infantile attitude toward life. His ambitions are childish, centered about his mother, and his relations toward other women, through whom he tries in vain to break away from the infantile attachment, serve only to reveal that he pursues a shadowy love which can find no object, because his attachment cannot release itself from the mother. This attitude she had fostered since his birth by substituting him in her love in the place of the despised husband, and when Paul has felt his mother as the obstacle to his life, she again asserts her love to bind him afresh. His intolerable burden leads him to hasten her death voluntarily but even then he is not free, but in the complete spiritualization of his love becomes more hopelessly bound and rapidly more helpless before the realities of life.

This represents a story not of a degenerate life, but rather an artistic presentation of a fundamental human complex, which, however, normally becomes sublimated with its source successfully repressed in the unconscious. This is attested by the fact that it is the expression of an important complex in the author's own life. So at least may be convincingly inferred from the other works of the writer, as well as from the partial story of his life contained in his biography. His poems, two other novels and a play are shown to contain the same struggle against the mother fixation, but the artist's power of expression has enabled him to sublimate it and so produce a catharsis for himself and his fellow beings.

14. *Translation: The Significance of Psychoanalysis for the Mental Sciences.*—The authors turn here to gain a general viewpoint for the psychology of myth formation. This discovers at once the egocentric figure of the myth-maker and the personification of his hostile and jealous impulses in the father or elder brother of the older myths, later modified by the twin brother motive. The same amelioration of the original myth introduces the rival as the pious avenger along with other ethical motives of paternal revenge and defense of mother or sister against troublesome foes. These all merely offer substitute symbolic modes of gratification through disguised wish phantasies for older primitive modes of wish fulfilment centering about the family complex, father and brother rivalry and incestuous desire for the mother and sister. Furthermore, these impulses are lifted out of the realm of human activity and imputed to superhuman beings, mysterious heavenly bodies or the gods, thus uniting naïve nature lore with the original purely human elements.

The same attempt to preserve through phantasy formation what had to be denied in the service of reality is the starting point of religion. Only gradually man came into the recognition of a differentiation between his endopsychic perceptions and the external world. With this, however, he lost that feeling of omnipotence in his relations to that world which was a part of his identification with them. Totemism and taboo immediately precede religion, in which are evident the universal existence of the wishes and on the other hand the necessary renunciation of them, however burdensome this was, for the good of the community. The most important prohibition contained in taboo was that directed against incest and the use of force toward

the head of the family as the rival of the sons. The object of the repression is therefore found as the deepest layer of the unconscious. The psychic tension resulting from this prohibition and the resistance toward it is relieved by projection upon the outer world for which an earlier animism had prepared the way. The belief in demons which thus arose marks the beginning of religion. This unites in turn with the attempt through magic to control the forces of nature and together the two sources create the myth. The wishes, spurring to ever more elaborate phantasy production, uniting the phenomena of nature with human elements, raise the demons to gods and multiply these in accordance with the increase of wishes subjected to repression. Religion is nevertheless a compromise structure for, while it eliminates the repressed instincts from reality by granting them phantasy gratification, it also allows a return of the repressed material in accordance with that material-imperious demand, and redirects this through cult and rite to a phantastic symbolic fulfilment, not in regressive manner but in an elevation above the affairs of everyday life which does not interfere with cultural necessity. With the increasing demand for repression, however, this ceremonial celebration attains increasingly distorted forms which recede farther from the original meaning. The authors emphasize especially the group of ceremonies connected with the feeling of guilt and sense of sin, the universal presence of which attests the foundation of repression upon which religion has been erected. The magic way of accomplishing a desired end, based upon the feeling of omnipotence, develops gradually into the most exalted mystic view of the efficacy of prayer, lost in the idea of communion with the deity. Other phases of the reappearance of instinctive forces in religion are the lessening of the paternal austerity, the creation of the maternal godhead, the representation in some particular feature of a religious cult, a strong individual wish tendency, even while the religious system, carried forward through an extensive elaboration, has lost its original distinctive significance and imposes itself as a generalized system. Repressed impulses which have become foreign to the conscious individual may appear in distorted and disguised form which belong neither under normal repression nor under the social arrangement brought about by religion, and which therefore have to submit to a second repression of the distortions themselves, leaving only a meaningless ceremonial. This is the case also in a compulsive neurosis. Dogmatism on the one hand represents the extreme secondary elaboration of the original material, while on the other hand a new personal way of discharge through mystic identification with the godhead corrects the extreme rationalism. The authors make mention of one important element running through all religions, in a variety of forms, the incestuous union of the mother goddess and her husband-son. This factor met in the course of development one fate of special importance. The tendency to repression brings to this young god the fate of castration, early death. This however is joined to the inacceptable fact of death in nature and human life and therefore leads further to resurrection, plainly symbolized phantasy of rebirth from the mother. This incestuous factor recedes in turn and gives place to the elaborate ideals of a future life. The infantile attitude toward the father manifests itself in a denial of the father contained in such a development or in the denial of atheism, or it shows itself in the dualistic attitude of many religions, where the creator and destroyer are united in one person or are represented by antagonistic beings. The ambivalence of the infantile attitude toward the father forms, therefore, a model for the attitude toward the heavenly Father.

Psychoanalysis is of great importance in the psychological side of a consideration of ethnology, which stands side by side with the study of external

factors in this science. The service of psychoanalysis here consists in the opening up of the unconscious mental content, thus offering a field of ethnological investigation not afforded merely by the conscious mental life of the members of human society. The symbols which appear in folk customs are like those of the dream language, residuals of a departed age which belongs in the one case to the race as a whole as in the other to the individual, infantile past. The psychoanalytic mode of investigation is necessary to understand this racial as individual unconscious since in both cases it represents the still active though hidden result of the forces of repression. The parallelism between racial and individual psychical life manifests itself also in external things, such as neurotic symptoms and the superstitious customs of primitive peoples based largely upon the same complexes, the family or incest complex. The same factor shown by psychoanalysis to be important for individual development is of equal significance in cultural development and this development proceeded from within outward through the energy derived from mental sources, of course greatly influenced by outward circumstances. The study of language reveals the same internal human sources, as had been already recognized before psychoanalytic investigation had been brought to bear upon the question. Speech would at first arise in response to hunger and sex needs. The latter met with repression which gave to speech a particular dynamic agency for the diversion of the original energy to other fields to which the original expressions for sex instincts came to apply. The peculiar modes of thought of the primitive mind, as revealed in the study of the unconscious, is of great value in comprehending the origin and earliest development of speech. These mechanisms are expression through opposites and establishment of connection through symbolism, by which often widely separated ideas are brought together and which establishes a connection also in remote ways through clang association. In this process certain symbols lose their original meaning, which is far withdrawn into the unconscious, and hence the value to etymological understanding, of the psychoanalytic investigation.

This same method of approach alone explains satisfactorily that contradictory fact that we enjoy in poetry, which is the form of art most accessible to psychological understanding, that which is most painful to the conscious mental life. The effect of poetic art is achieved chiefly by the transposition of the listener into a condition where the experiences related take on for him a subjective reality, more or less complete in the dream, the myth, the day dream or the poem, according as each is able to enter more or less completely into the infantile buried sources of pleasure. The poem is lifted out of mere individual service, like that of the day dream, through the thorough entrance of the artist into the ultimate common human traits in which a sympathetic feeling is possible. The unconscious affects, though of greater intensity and even of opposite pleasure phase to those in the conscious, are brought to a discharge through association in a manner which gratifies at the same time the unconscious wishes of the artist and his hearer. Poetry makes use of all the disguise mechanisms of the dream for bringing this gratification to pass, while evading the censor and this gives to art its endless variety. The painful character which cannot, however, be entirely removed from this circumventing wish-fulfilment is further woven into the conscious side of the work of art and becomes an additional mask for the unconscious pleasure. Even the suffering, on the other hand, has its unconscious pleasure side in the fundamental sadism-masochism belonging to the unconscious. The means of producing the pleasurable effect are those considered in Freud's study of wit. There is an economy in the distribution of affect by which this is raised slowly to the highest degree where it may be quickly abreacted. The

same economy of thought works toward the same end, carrying directly to the pleasurable end. Here belong also the external means by which art attains its end, of which rhyme and rhythm are distinctive examples. These means like wit provide a fore-pleasure, which produces a psychic tension and preserves and strengthens it for the final discharge in the end-pleasure toward which the work of art trends. This same motive of economy is extended to other fields of art, as the economy of vision in the art of painting. The unconscious as the source of art explains the peculiar inspirational appearance of the artist's material, while the accessibility of this links him to a certain extent with the neurotic. The fundamental distinction, however, exists in the ability to utilize the unconscious material in the struggle for taming and ennobling original instincts in the service of culture, to free men from these instincts without an entire renunciation of the pleasure, to transform these instincts into nobler forms, or to discover a new freedom from repression, which may occur in the course of development, and bring this forward into actual life for the benefit of his less intuitive contemporaries.

The attitude of psychoanalysis toward philosophy reveals in this too the unconscious source of its special forms of activity and content of its speculations. The authors select three broadly conceived types of philosophers for consideration. The type of analytic thinker becomes of interest particularly in his peculiar character formation and personality, in which the philosopher shows the tendency to shut himself away with his thought and thus betrays the same thought occupation with transcendental questions, ethical scruples, subtle inquiry, search for explanation and cause, as well as the narcissistic lingering upon his own thought, which marks the neurotic reaction to strongly repressed infantile tendencies. His attitude toward the outer world is therefore an egocentric one, which, by a far-reaching introversion of the libido, finds the pleasure in the thought processes themselves and projects the thought as reality upon the outer actual world. The positivistic investigator, on the other hand, has so touched objective reality and sublimated thus his libidinous impulses, that he affords but little interest to psychoanalytic investigation. Quite the contrary is it with the type of metaphysical philosopher whose artistic personality as well as the content of his work reveals him as very near the unconscious source of mental life. His introversion of interest and autistic manner of thought separate him from the artist, who is driven to external expression. This philosopher seeks one of two forms of expression of his metaphysical thought, that of a creator, producing the world from himself or by his fiat from nothing, which psychoanalysis recognizes as the universal unconscious projection of a father image, or in a dualistic system which projects the unconscious sexual conception. The mystical systems represent flight from reality into infantile wish situations arising out of the unconscious, and likewise a narcissistic self-reflection of the individual in the cosmos. Ethics, also, as a philosophic discipline, arises originally out of the repression of the gross egoistic, violent and cruel impulses of man and the reaction formations of pity, human love and the like, the alternation between the two marking the history of ethics. The original temptation as well as the motive for its repression may both disappear from consciousness and therefore the individual source of ethics be lost sight of. The exaltation to the social motivation in the foreground is manifest in the prohibition of law, wherein, even though it seems far removed from the pleasure aim of the unconscious, it yet reveals its ultimate source there, especially in criminal law in its saturation with ethical and religious views and externally in the symbolisms which attach to it. These all speak of the unconscious motivation of punishment as an indirect gratification of the death wish as well as a

desire to participate unconsciously in the committed crime. Psychoanalysis has approached the problem of crime through Jung's associations experiments, which are based upon the emotionally toned complexes to which the criminal acts belong. The historical fact that the murder of a father is considered the archetype of crime and his protection the first occasion of the establishment of culpability for an act, presents a parallel to the discoveries of psychoanalysis in unconscious mental life.

Psychoanalysis was first of all, however, not a science for enriching our knowledge of the human psychical life, but a therapeutic means of freeing repressed instinctive impulses from the false symptom-forming attitude and adapting these impulses anew to valuable paths of activity. It is therefore a system of reëducation and as such is, in its principles and methods, peculiarly applicable to pedagogy. It in the first place presents an intelligent prophylaxis against those influences and tendencies in development which the therapeutic work has discovered and appraised and it guides to a wiser attitude toward the child's development as an independent being who should be counseled and directed with as little inhibition as possible. The phenomenon of transference, the value of which psychoanalytic therapy has recognized, must be held of equal importance in pedagogy as the most important lever of influence and yet demanding control in order to accomplish the necessary sublimation and separation of the libido from the parent. Psychoanalysis has valued the important rôle of the original instinctive impulses, reactions to them or diversions of them to higher aims in the formation of character and on this basis leads to a utilization of such impulses and sublimated building upon them for the child's future career, thus turning to good account the otherwise "perverse" components in the child's developmental character. It offers, moreover, frequently aid and guidance technically through the educator and the spiritual adviser in correcting already developed false tendencies in the young, and in correcting also certain eccentricities, anxiety conditions, minor mild nervous symptoms and the like, often necessarily with the aid of the medical treatment, but accessible also to pedagogical analysis. Its pedagogical significance extends to the great task of obtaining a better control of the unconscious, which results in a constant widening of the field of conscious vision. This also necessitates in the interest of racial progress further renunciation of the pleasure principle in favor of increasing adaptation to reality.

15. *Translation: Processes of Recovery in Schizophrenics.*—Three methods of recovery are particularly observed by the author as offering to the schizophrenic patient a possible outcome of his disorder, and are therefore of prognostic value to the physician. Bertschinger states concisely the essential nature of the mental disturbance, the eruption of the unconscious into the conscious and the individual reaction to this depending on age, psychic constitution and the like. Improvement or recovery from the manifest disease symptoms, which are the result of the above reaction, mean establishing again a correspondence to reality. The first of these three methods by which this is obtained partially or completely is that of correction of the delusions. Intelligent patients begin to examine their delusions, make objective tests or comparison with other patients or respond to analysis and explanation on the part of the physician.

More frequently there is resymbolization of the unconscious complex. This takes place in part through transference upon the physician. It may come about by a reinterpretation of the actual world to fit with the subjective wish, or there may be such an alteration of the wish that it can conform to external conditions in a more harmless existence symbol than that employed in the original delusion. This is illustrated in several patients whose wish

was symbolically satisfied by the removal of a tooth or several teeth, in delusions concerning childbirth. Resymbolization also creates somatic conversion symptoms or utilizes already existing morbid conditions.

The third method which Bertschinger discusses he calls "evasion of the complex," a common enough process, as he says, but one which in its nature is not always successful. Little by little through the delusional content the patient brings about the fulfilment of the wish. Sometimes at the end the patients change themselves in order to crowd out of consciousness the memory of the delusional state through which they have just passed. The practical difficulty in the way, however, of success through this method is that a certain period of time has elapsed and perhaps physical deterioration has taken place. so that it is difficult or impossible for the patient to resume life successfully in the real world. The age at which the onset of the disturbance occurred is of course a factor working favorably or not toward such a readjustment.

Sometimes, also, a very strong affect entering in has again made possible the repression of the original complex, just as probably work or other interest acts therapeutically.

16. *The History of the Phychoanalytic Movement.*—Freud upholds his right to speak with authority upon this subject, as the originator and for ten years the sole exponent of psychoanalysis. His acknowledgment of indebtedness to those from whom certain ideas were received, which he was later to develop into psychoanalysis, grants a full history of the inception of his great work. These ideas had been dropped into Freud's mind there later to group themselves into the beginning of his activities. The three men to whom he owed his special debt "had imparted to me," Freud states, "an insight which, strictly speaking, they had not themselves possessed." From Breuer, Charcot and the gynecologist Chrobak he received the suggestion, new to him, of the sexual etiology of neurotic disorders, but these men had never pressed the idea to practical completion. Freud began his "cathartic" work with nervous patients in collaboration with Breuer, working with the aid of hypnosis. Breuer had discovered the existence of reminiscences, traumata as then believed, but attributed to Freud the theory of conversion. The search after the traumatic event early revealed the process of regression. Breuer had not pressed his analyses back to a clear recognition of the sexual element and here was probably the deeper cause of his break with Freud, for he left Freud to stand alone. Freud worked independently toward his theory of repression, the main pillar of psychoanalysis, as he calls it, though later he discovered its recognition by earlier thinkers. The history of psychoanalysis really starts with the rejection of hypnosis, since this was unable to deal with the important factor of the transference and resistance. Then followed the recognition of phantasy as of equal importance to the existence of actual trauma, these phantasies serving "to hide the autoerotic activities of the early years of childhood, to idealize them and place them on a higher level." The formulations of child sexuality were confirmed later by analyses of very young children. The understanding of dream interpretation was a gradual growth following upon the replacing of hypnosis with the psychoanalytic technique, and formed a support during the early difficult mastery of technique, clinic and therapy of the neuroses. Freud gives throughout this early history a modest statement of his isolation and quiet, patient investigation, willing to stand alone and be forgotten if only his discoveries might be remade when society was more ready to receive them.

But in 1902 a circle of young physicians began to seek out his teachings and to spread abroad psychoanalysis. Conspicuous in this company was a non-medical student, Otto Rank, who has proved a most valuable exponent

of psychoanalysis. There were soon evidences of the extension of psychoanalysis to other circles and in 1907, 1908 it received the hearty support and coöperation of the Zurich school. Here Wundt's association experiments were used in the service of psychoanalysis and more important still Bleuler and Jung applied it to the understanding of psychiatric cases. While, however, they sought to interpret symptoms and adhered to organic and toxic etiological theories in regard to dementia præcox, Freud claims interest particularly in the psychic mechanisms of schizophrenia and the agreement of these with those of hysteria, including psychotic with neurotic appearances in the libido theory. From the Swiss school came also the convenient, descriptive term offered by the theory of the "complexes." Psychoanalysis now extended rapidly into various parts of the world, Freud and Jung themselves being invited by G. Stanley Hall to present it to America. As the movement spread in territorial extent it also expanded beyond its limited technical field, since it began to show in its psychological discoveries the connection of pathological occurrences with normal psychic life, and thus racial psychology, literature and other esthetic products became subject to its investigations, while it very naturally entered the field of pedagogy.

Freud now traces the history of psychoanalysis among its immediate exponents, although this involves his entering the field of controversy with his colleagues in a manner from which he had always refrained with the opponents of the new movement. He attempted to establish a psychoanalytic organization under the leadership of a younger man in full sympathy with the movement and at a more central place than at Vienna and therefore chose Jung and his city Zurich. The place was, however, conceded to Vienna, in order to satisfy certain opponents to this arrangement and an official publication was adopted as the organ of the society. There were also three local groups formed and soon The New York Psychoanalytic Society followed later by The American Psychoanalytic Association. Local societies were also formed elsewhere, at Münich, Budapest and London. Gradually also there grew up a more extensive periodical literature.

The two secessions from psychoanalysis of which Freud feels compelled to speak in detail are those of Adler and Jung. To the former Freud concedes "a superior mind, especially endowed speculatively," but states that he has turned his talent away from the true service of psychoanalysis to an "individual psychology," which has developed on its own lines. Adler's insistence upon the principle of the "masculine protest" is founded upon aggression and he places the ego striving in the center of attention in such a way as to eclipse the libidinous components and so the origins of the neurosis which lies in these. He reveals but slight estimate for the unconscious; in fact, as Freud thinks, his theory rationalizes in order to conceal the unconscious motives. Neither does he seem to understand the principle of the repression. His contributions to the psychology of the ego are not of particular value to psychoanalysis while some of his statements are merely a renaming of long well-known features. The secession of the Swiss school took place at a later date. It sought to overcome resistances to psychoanalysis, like Adler, by assuming certain exalted points of view. Both advocate a personal right of artificial construction of knowledge and action. Adler's efforts to exalt the ego psychology denied the fundamental psychoanalytic principles, while Jung and his adherents follow the same course by making these fundamental factors, which they conceive as present in a "symbolical" sense, as representative only of the higher ethical and religious striving, and putting an abstract conflict in place of the strivings of the sexual libido, the actual erotic conflict. Freud quotes the report of a patient who failed to find the strength for such a radical transformation which this doc-

trine entailed upon him without offering him the previous aid of the concrete analysis which recognized the actual factors. Freud calls attention also to the disappearance of the mention of repression from Jung's later writings. He refers likewise to the lessened attention given to the latent dream thoughts. Jung himself had earlier stated the withdrawal of the libido from its investing complexes as the task of psychoanalytic therapy. This, however, Freud insists, "can never be accomplished by rejecting the complexes and forcing them toward sublimation, but only by the most exhaustive occupation with them, and by making them fully conscious. The first bit of reality with which the patient has to deal is his malady itself." Freud foresees that in spite of such modifications of the principles of psychoanalysis, it will proceed steadily along its way.

Notes and News

At a meeting of the New York Psychiatrical Society held December 6, 1916, a committee was appointed to inquire into the activities of psychologists, and more particularly of those who have termed themselves "clinical psychologists" in relation to the diagnosis and treatment of abnormal conditions. This committee desires to make the following report.

We have been greatly impressed by the earnestness and success with which psychologists are endeavoring to make their science serviceable in dealing with the practical affairs of everyday life. We wish to record our belief in the wide usefulness of the application of psychological knowledge and of the findings of certain psychological tests in such fields as the modification of educational methods with reference to individual differences, the vocational problems presented in various special industrial operations, the development of scientific methods in advertising, salesmanship and other means of business appeal and in the investigation of such special problems as the relation of environmental factors to the quality and quantity of the output of the individual. We feel that the results to be attained in these fields justify the belief that the widening of the scope and application of psychological knowledge will make psychology one of the most useful of the social sciences instead of a narrow field for study and research with but little actual contact with the practical problem of life.

We have observed with much distrust, however, the growing tendency of some psychologists, most often, unfortunately, those with the least amount of scientific training, to deal with the problem of diagnosis, social management and institutional disposal of persons suffering from abnormal mental conditions. We recognize the great value of mental tests in determining many questions which arise in dealing with such patients but we have observed that most of such work which is being done by psychologists and particularly by persons whose training in psychology is confined entirely to learning how to apply a few sets of these tests, is carried on in schools, courts, correctional institutions and so-called "psychological clinics," quite independently of medically trained workers who are competent to deal with questions involving the whole mental and physical life of the individual.

We believe that the scientific value of work done under such conditions is much less than when carried on in close coöperation with that of physicians and that serious disadvantages to patients suffering from mental disorders and to the community are likely to result and, in many instances which have come to our attention, have resulted. This is especially true when the mental condition of the patients examined involves questions of diagnosis, loss of liberty or educational issues more serious than redistribution of pupils or rearrangement of courses of study. In spite of these facts two States have enacted laws permitting judges to commit mentally defective persons to institutions upon the so-called expert testimony of "clinical psychologists" regarding the abnormal mental conditions from which patients are alleged to suffer. We believe that the examination upon which a sick person is involuntarily committed to permanent institutional custody is one of the most serious responsibilities assumed by physicians and that in no cases whatever should it be entrusted to persons without training enabling them to take into consideration all the medical factors involved. The same is true of mental examinations of juvenile delinquents and criminals whose whole careers depend, in many cases, upon the determination of their condition.

We desire to make the following specific recommendations:

1. We recommend that the New York Psychiatrical Society affirm the general principle that the sick, whether in mind or body, should be cared for only by those with medical training who are authorized by the State to assume the responsibility of diagnosis and treatment.

2. We recommend that the Society express its disapproval and urge upon thoughtful psychologists and the medical profession in general an expression of disapproval of the application of psychology to responsible clinical work except when made by or under the direct supervision of physicians qualified to deal with abnormal mental conditions.

3. We recommend that the Society disapprove of psychologists (or of those who claim to be psychologists as a result of their ability to apply any set of psychological tests) undertaking to pass judgment upon the mental condition of sick, defective or otherwise abnormal persons when such findings involve questions of diagnosis, or affect the future care and career of such persons.

Charles L. Dana, *Chairman.*
Adolf Meyer.
Thomas W. Salmon.

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Original Articles

THE SYMPTOMATOLOGY OF CERTAIN INFECTIOUS PROCESSES INVOLVING THE CILIARY GANGLION OR ITS CONNECTIONS[1]

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Within the last two years, I have had occasion to examine a number of patients who complained of headache, supraorbital distress upon using the eyes for near work, vertigo, general exhaustion, mental depression and other apparently neurasthenic symptoms and in whom careful examination revealed definite objective evidence of disordered innervation of the ocular musculature. In all of these cases, a symptom complex consisting of bilateral weakness or paralysis of accommodation and convergence with consequent failure of the associated pupillary contraction, but with retention of the pupillary light reflex, was demonstrable. It is believed that this syndrome is dependent upon pathological changes involving the ciliary ganglion or some of its related fiber bundles. While this conclusion is based purely on clinical observation, there having been for obvious reasons, as we shall see later, no opportunity for anatomopathologic control, the assumption appears justified in the light of our actual knowledge of the ciliary ganglion and its connections derived from abundant anatomic studies and from physiologic and pharmacologic experiments. We know that the motor oculi sup-

[1] Read at the Forty-third Annual Meeting of the American Neurological Association, May 21–23, 1917.

plies directly a large part of the extrinsic ocular musculature and it is generally conceded that it likewise supplies, though indirectly, the intrinsic ocular muscles, namely the ciliary muscle and the sphincter of the iris, through the intermediary of the ciliary or ophthalmic ganglion, a small flattened, greyish-red body situated at the back of the orbit between the optic nerve and the external rectus muscle, and below and to the outer side of the ophthalmic artery. The connection of the motor oculi with the ciliary ganglion is effected by means of a short thick root, called the motor-root, derived from the lateral branch of the inferior division of the motor oculi destinated to the inferior oblique muscle. We also know that the ciliary ganglion receives a sympathetic filament from the cavernous plexus and in addition a sensory root from the nasal branch of the ophthalmic division of the fifth nerve, the exact function of both of which we still ignore although it is assumed by Van Gehuchten[2] and others that the sympathetic filament is concerned with the innervation of the ciliary and iridian vessels. From the ciliary ganglion proceed the short ciliary nerves, numbering anywhere from six to fifteen according to different anatomists, which surround the optic nerve, pierce the sclera at the posterior pole of the eyeball, run forward between the sclera and the choroid as far as the ciliary body where they divide into their terminal branches distributed mainly to the ciliary muscle and sphincter of the iris, though likewise to the cilio-iridian vessels and perhaps to other adjacent structures within the eyeball.

It may be admitted that through its afferent and efferent branches the ciliary ganglion represents the peripheral organ presiding over the mechanism of accommodation and indirectly over that of convergence, inasmuch as accommodation and convergence are physiologically interdependent. While the one may rarely be executed independently of the other (temporarily under atropine instillation for instance and in certain lesions of the brain-stem), it is undeniable that convergence simply subserves accommodation and it is difficult to conceive that it may serve another purpose. We would therefore expect that in any lesion compromising the integrity of the ciliary ganglion or its afferent branches, the resulting abolition or impairment of accommodation would necessarily determine an associated and proportionate reduction of convergence together with disturbances of pupillary reaction. It is believed that under such circumstances the pupillary light reflex, though enfeebled, will per-

[2] Van Gehuchten, Anatomie du Système Nerveux de l'homme, Louvain, 1906, p. 619.

sist unless the lesion is a destructive one, such as would result from extensive infiltration or traumatism.

The syndrome thus characterized is by no means a new one, having been observed under different circumstances and being actually described in many text-books, but it is believed that its clinical significance and pathogenesis have not been altogether correctly interpreted. It is interesting to recall briefly in this connection the prevailing conception of convergence paralysis and the more important facts signalized by leading authors.

It is stated in some text-books[3] that convergence paralysis in many cases is purely accommodative and that it occurs in those who do not require normal accommodative activity, *i. e.*, the disuse of the one entailing disuse of the other, and it is a fact for instance that in myopes convergence and the associated pupillary contraction are far less pronounced than in normal eyes. Convergence paralysis is accompanied by failure of the convergence reaction of the pupil whereas the pupillary light reaction is intact so that the syndrome represents the converse of the Argyll-Robertson pupil phenomenon. The convergence paralysis symptom complex is rare according to some, not infrequent according to others, and often appears suddenly accompanied by vertigo and by more or less false projection. The condition has been observed in connection with tabes, general paresis, syphilitic basal meningitis, multiple sclerosis, myelitis, tumor of the corpora quadrigemina and other organic lesions of the central nervous system. It has also occurred in association with alcoholism, tuberculosis, Basedow's disease, influenza and diphtheria. In regard to diphtheria, it is a curious fact that many authors refer to paralysis of accommodation without specifying the concomitant convergence inadequacy and pupillary inactivity and yet in the course of the last year, I have seen four cases of post-diphtheritic accommodation paralysis in all of which both of these phenomena were associated. Perhaps this is not invariably the case but it must be very common and a statement to this effect may be found in the works of Dana[4] and Dejerine.[5] Convergence paralysis may spontaneously clear up in a short time or persist indefinitely.

The causative lesion of the convergence paralysis syndrome has

[3] Alexander Duane, article on the Extra-Ocular Muscles in Posey and Spiller's text-book, "The Eye and Nervous System," Philadelphia, 1909, pp 256 and 257.

John E. Weeks, article on the Intra-Ocular Muscles in same text-book, pp. 311 and 312.

[4] Dana, Text-book of Nervous Diseases, eighth edition, New York, 1915, p. 101.

[5] Dejerine, Sémiologie des Affections du Système Nerveux, Paris, 1914. Vol. II, p. 1144.

been theoretically localized in the mid-brain, in one of the nuclear segments composing the long cellular column of the oculomotor nucleus (capillary hemorrhages, degenerative changes in the ganglion cells), or even in the cerebral cortex or subcortical fiber tracts. In influenza and diphtheria, however, some authors have more logically attributed the paralysis of either the intrinsic or extrinsic ocular musculature to basilar or orbital neuritis, or to inflammatory changes in the muscles themselves or in Tenon's capsule.

It is further maintained that a simple or non-accommodative convergence insufficiency, *i. e.*, one developing independently of any refractive error, occurs in hysteria, neurasthenia, traumatic neurosis, anemia and debilitated states. This may perhaps occasionally be true but it would seem extremely doubtful that a neurosis could determine any such functional deficit in the absence of definite circulatory disturbances or of toxic or infectious states. In fact, the same authors admit that a similar condition may result from intranasal disease and from certain exogenous poisons (alcohol, ether, chloroform, chloral, etc.). It may be stated here that the impairment of accommodation and the associated visual disturbance need not be considerable in order to inhibit convergence and that the discomfort experienced by the patient depends largely upon the preexisting state of the refractive mechanism It is a fact, nevertheless, that a greater or lesser degree of convergence insufficiency sometimes occurs although accommodation is apparently preserved and the pupils react to accommodation efforts. I have seen a few such cases but have never observed the inverse phenomenon, *i. e.*, the loss of the pupillary reaction to accommodation efforts with retained convergence, although this type of dissociation has been reported by others.

Some authors (De Schweinitz,[6] Schwartz, Parinaud, Borel Sweigger and others), however, take a different view of the disorders of the ocular musculature occurring in the various neuroses and under the heading of "hysterical asthenopia" or "hysterical cycloplegia" describe a condition in which bilateral impairment or paralysis of accommodation is associated with proportionate inadequacy of convergence and accompanied by photophobia, obscuration of vision, inability to maintain fixation, ocular pain, headache and radiating pains in the suboccipit and neck. This serves to emphasize the fact that accommodation and convergence disturbances almost invariably coexist. The purely functional or hysterical nature of the disorder, however, remains in my opinion a debatable

[6] De Schweinitz, article on Neuroses and Psychoses in Posey and Spiller's "The Eye and Nervous System," pp. 640, 644, 657.

question. That such functional losses may determine a whole series of purely neurotic or hysterical manifestations or that they are particularly prone to develop in individuals constantly using their eyes and previously predisposed by virtue of an inherited or acquired neuropathic temperament is undeniable, but all this does not prove that the accommodation convergence weakness or paralysis itself does not develop on the basis of intercurrent infection or toxemia. This supposition receives some support from the fact that Schwartz for instance found in some of his cases of hysterical cycloplegia more serious disorders such as disturbances of the light and color sense, mydriasis and even central scotoma.

In reaching the conclusion that the syndrome of accommodation convergence paresis, occurring as an isolated clinical manifestation, is due to involvement of the ciliary ganglion or its dependencies, I have been partly guided by the findings in several cases of definite unilateral retro-bulbar disease in which along with more or less exophthalmos, ciliary neuralgia and changes in the fundus, the only symptom referable to the third nerve was weakness of accommodation and convergence and loss of the related pupillary reaction. Otherwise there existed no evidence of actual implication of the third, fourth and sixth nerves, *i. e.*, there was neither strabismus nor diplopia and no nystagmus. It is not meant to infer that in these cases the lesion was limited to the ciliary ganglion, but that this ganglion was involved in the exudative or infiltrating process affecting the retro-bulbar structures. Being imbedded in fatty areolar tissue and located in the immediate proximity of the optic nerve and ophthalmic artery, it is easy to understand that it would almost necessarily be involved in any infectious process gaining access to the deeper part of the orbit and it is difficult to account for the symptoms observed otherwise than by attributing them to a lesion of this ganglion or its connections.

To facilitate the presentation of this subject, a few of the more demonstrative cases are reported. Except when otherwise specified the general neurological findings were negative and are purposely omitted. For the same reason irrelevant facts in the family and personal history are eliminated.

Case I. W. D. B., male, age 33, married. His occupation is that of secretary for a large employing agency and in addition he is studying law. Smokes cigarettes to excess but does not use alcohol in any form. Contracted lues eleven years ago. Wassermann reaction at the present time negative.

He was seen for the first time November 20, 1916, and com-

plained of more or less rigidity of the neck, oscillating sensation in the head and inability to read without soon experiencing supraorbital distress. His trouble had come on acutely in July, 1916, with intense vertigo, pain in the eyeballs upon moving them, pain in the occiput and rigidity of the neck, general prostration, nausea, diarrhea, slow pulse and subnormal temperature. Most of these symptoms had cleared up after a few days, save those previously noted.

Physical examination showed a mild degree of exophthalmos on both sides but distinctly more marked on the right. Ocular excursion was normal in every direction save convergence which was practically nil. The pupils reacted actively to light but not at all to accommodation and convergence efforts. Ophthalmoscopy showed slight congestion of both discs. The field of vision showed no contraction for form but definite changes as regards color perception, the green being practically lost in the left eye and extremely small in the right eye.

The patient was sent to an oculist for careful refraction and appropriate glasses and was given strychnin and tonics internally. The oculist reported a considerable degree of mixed astigmatism. A very decided improvement followed and subsequent examination revealed almost perfect restoration of convergence and pupillary reaction after a period of four months.

Case II. V. M., male, age 38, married, engineer on Hudson River boat plying between Albany and Newburgh. Uses neither alcohol nor tobacco and denies all venereal disease.

He first came for examination November 27, 1916, and gave the following history. Four weeks before he noticed a pimple on the left eyelid and also a painful tumefaction in the nostril; he did not remember having been bitten by insects but had nosebleeds following these local lesions and more or less constant pain in the left forehead. Some time afterward, he experienced difficulty in reading the newspaper and stated that letters would run together so that everything became blurred. He still complained of pain in the left forehead, also of general prostration, dryness of the mouth, mental depression and spasmodic attacks of crying coming on without motive and which he was unable to repress. In fact he had such an attack during the consultation, it was accompanied by marked flushing of the face and followed by visible dyspnea. His systolic blood pressure was 100 mm.

Neurological examination showed the following condition. A slight but definite exophthalmos was present on the left side. Convergence was almost nil and the pupillary reaction to accommodation and convergence extremely faint on both sides. The pupils were in a state of relative mydriasis and reacted well to light. The corneopalpebral reflex was markedly weakened on either side but there existed no disturbance of objective sensibility about the orbits. The eye grounds were perfectly normal. The Wassermann reaction was negative. This patient likewise rapidly improved under general tonic medication and with the help of correcting lenses.

Case III. I. E. W., male, age 50, married, mail clerk on Dela-

ware and Hudson Railroad. Uses neither alcohol nor tobacco and denies all venereal infection. He was operated for deviation of the nasal septum in January, 1916. His trouble began rather acutely in the latter part of April, 1916, with diffuse headache, dizziness, gastro-intestinal disturbances, pains in the back and lower extremities and general prostration. His family physician made a diagnosis of influenza and ordered him to remain at home for two weeks during which time his general condition improved, but other symptoms developed, namely increasing difficulty of using the eyes without discomfort, blurring of vision, metamorphopsia upon looking to the left and almost constant supraorbital headache. Most of the latter symptoms persisted and he became melancholic, even tearful at times, complained of anorexia and loss of memory.

He first came under my observation September 11, 1916, and presented at this time distinct exophthalmos on the left side as well as widening of the palpebral fissure. There was a slight restriction of ocular excursion to either side and a suggestion of internal strabismus on the left side when the patient looked directly forward but careful testing failed to reveal any evidence of diplopia. This condition was possibly due to previous paresis of the external rectus or it may have been congenital. Convergence was not executed at all and the pupils did not react to accommodation and convergence efforts. They did react though sluggishly and incompletely to light and this was controlled by testing the light reflex after leaving the patient in a dark room for fifteen minutes. The eye grounds showed definite pallor of the temporal segment of both discs, more marked on the right side. The Wassermann reaction was negative. The oculist reported bilateral mixed astigmatism but practically perfect vision with correcting glasses. All attempts at anti-syphilitic medication were promptly followed by symptoms of intolerance and the patient was simply given general tonics. His improvement was nevertheless remarkable. October 16, 1916, the exophthalmos was barely noticeable, ocular excursion laterally was practically the same as before but convergence had partly returned and the associated pupillary contraction was distinct, though still imperfect. He still complained of daily frontal headache, mental depression and amnesia but admitted the favorable progress of his case. When last seen, March 24, 1917, he stated that aside from defective memory and occasional headache after prolonged use of the eyes, he felt practically as well as he ever did. Examination showed almost perfect convergence and pupillary reactions. The faint inward deflection of the left visual axis was unchanged, however, and this confirmed my belief that this particular finding had existed since childhood.

Case IV. X. Y. Z., male, age 46, married. Although a lawyer by profession, he has not practised law for many years, but has devoted a large part of his time to editorial pursuits and has held several exalted positions in public life. This man has been under my care at different times during the last ten years for shooting pains in the lower extremities resulting from arthritic changes in the dorso-lumbar region of the vertebral column, a condition which has

recently become relatively quiescent. He smokes very moderately but does not drink at all and has never contracted any venereal infection. He has been subjected repeatedly to most exhaustive neurological examinations and it is positively established that, aside from a fair degree of myopia dating from childhood, he presented no ocular nor optic nerve disorder prior to the development of the manifestations presently to be described.

In the latter part of March, 1916, the patient accompanied by his wife went to the Bermudas and unwisely indulged in prolonged reading and without the use of colored glasses while seated on the steamer deck and in the full glare of the sun. He subsequently experienced pain in and about the eyes, dimness of vision and more or less vertigo. Upon his return home he consulted an oculist who made a diagnosis of solar retinitis and ordered rest and colored glasses. His condition improved to some extent but he still felt dizzy and suffered from pains in the forehead and occiput. He first consulted me for this condition April 21, 1916, complaining of dizziness upon using the eyes, or suddenly changing posture, feeling of traction and constriction in the temporo-parietal region on both sides and of occasional dull twinges along the sagittal suture and in the subocciput.

Examination at this time showed a faint bilateral prominence of the eyeballs, slightly limited ocular excursion to either side but especially upwards and practically complete insufficiency of the internal recti upon attempts at convergence. Moreover, such efforts as well as all tests for accommodation showed failure of pupillary reaction, whereas the pupils reacted promptly to light. Ophthalmoscopy revealed a relative pallor of both discs, distinctly more marked on the left side. In addition, on this side, the right lower (or inferior temporal) quadrant of the disc margin was occupied by a peculiar, irregularly serrated, crescent-shaped, opaque area suggesting exudate or atrophic shrinkage; this area was limited laterally by a wavy, greyish strand resembling a degenerated choroid margin. Otherwise there was no evidence of inflammation or edema. The patient was seen repeatedly during May, June and July and his condition remained at a standstill. The Wassermann test made in different laboratories was invariably reported negative. He consulted one after another several of the most eminent oculists in the country and while all agreed regarding myopia and astigmatism, all expressed different opinions regarding the condition of the eye grounds and the cause of the subjective disturbances. One stated that "vision with proper glasses is normal and aside from rather small myopic crescents due to his myopia, there is nothing pathological in the condition of the eyes." If by "small myopic crescent" the marginal area of the left disc above described is referred to, it is difficult to admit the interpretation. The condition is unilateral, has extended upwards within the last few months and certainly did not exist prior to March, 1916, as I examined the eye grounds at that time. My opinion is that the patient, besides his retinal traumatism due to his own carelessness, developed an infectious process of the retro-ocular tissue

with perineural involvement of the optic nerve. Perhaps subsequent thickening at the optic foramen or sphenoidal fissure has interfered with the circulatory exchanges at the base and thus accounts for the vertigo and other discomforts. In this connection the possibility of rheumatic localizations within the orbit, involving more particularly Tenon's capsule, should be borne in mind and Terson[7] has recently called attention to the importance of this lesion. It is possible that in this patient who belongs to an arthritic family and is himself the victim of rheumatic spondylitis, the retinal injury furnished the localizing factor in the development of such a retro-ocular rheumatic process. It is a fact at any rate that he has improved very materially under persistent and active anti-rheumatic medication, after all other measures had failed.

Case V. J. M., age 24, single, student in a theological seminary, patient of Dr. F. M. Sulzman, of Troy, N. Y. History of excessive use of the eyes at night during years. Patient had no habits of intemperance and never contracted venereal disease. Wassermann reaction repeatedly negative. A tuberculin test made in a New York hospital was reported strongly positive but there was no physical evidence of tuberculosis in the patient otherwise.

The history of the case obtained from the attending physician is as follows. The condition originally set in October, 1915, with pain about the left orbit, hemorrhages in the left retina and consequent loss of vision which subsequently returned almost integrally, however, so that the patient resumed his studies. In March, 1916, hemorrhages occurred in the right eye but in a less severe fashion than before, so that vision while enormously reduced was not massively impaired from the start, but rather progressively. The condition since then had distinctly improved but the patient still had a most serious reduction of visual acuity in the right eye and likewise complained of photophobia, blunting of olfaction, and mental depression. He was seen in consultation December 10, 1916.

Physical examination at this time revealed the following facts: the right pupil was dilated as the result of atropin instillation; the left pupil was moderately dilated but not under atropin. This pupil reacted perfectly to light but did not react to accommodation efforts and neither eye turned in in response to convergence tests, both of which findings, however, were perhaps of doubtful significance by reason of the therapeutic disability of the right pupil. There was no exophthalmos. Ocular excursion was somewhat restricted laterally on both sides and accompanied by slight nystagmiform oscillations. Elevation of the eyeballs was practically nil. The patient could not keep the eyes closed owing to coarse quiverings of the superior eyelids amounting to a veritable intention tremor. This may have been due to weakness of the orbicularis, but more probably resulted from spasm of the levator palpebrae. It may have been a purely neurotic manifestion though this seemed doubtful in the absence of other hysterical phenomena. The attending oculist

[7] Terson, Ténonites rhumatismales et goutteuses, Paris Médical, 1916, No. 45, p. 391.

stated that at the onset of this condition there was no evidence of actual disease of the optic nerves, *i. e.*, no exudate, no edema, no imprecision of disc outline save as the result of peri-marginal hemorrhages. The hemorrhages apparently occurred in conjunction with an otherwise rather pallid nerve-head.

The patient was kept in a dark room, all use of the eyes forbidden and he was given internally glycerophosphate of calcium, iodide of potassium as well as general tonics. I learned, February 6, 1917, that vision had markedly improved and that he could count fingers at twenty inches. An accurate record of his visual field on the affected side was impossible however owing to the presence of a floating mass in the vitreous. The excursion of the eyeballs was now excellent in all directions except elevation which still remained markedly restricted.

I again had occasion to examine the patient, April 2, 1917, and found decided amelioration in every respect save that there still remained a gross inadequacy of convergence and that while the pupils reacted well to light they apparently were not at all influenced by efforts at accommodation and convergence. There still remained floating opacities in the vitreous on the affected side however and probably this should be taken into account.

Case VI. C. A. C., male, age 64, farmer, patient of Dr. Geo. Moston of North Creek, N. Y. Patient was in the habit of chewing tobacco rather freely but denied venereal infection and overindulgence in alcohol. He was referred to me for examination, October 19, 1916, and gave the following history. In the latter part of April, 1916, he had a large boil on the left lower eyelid which caused him considerable discomfort for a few days. Toward the latter part of June, he began to notice marked impairment of vision in that eye and the eyeball itself was sore to the touch and pain was experienced by moving the eyes. He did not suffer much from actual headache but stated that the head felt strange and that he became gloomy and inclined to somnolence. There was some vertigo but no vomiting and no disturbance of gait. These various symptoms persisted throughout the summer and he decided to consult an oculist owing to his steadily decreasing vision. The oculist who referred the case to me for neurological examination made a diagnosis of "choked disc and hemorrhages in the left eye" but was at a loss to account for the condition.

Physical examination showed that ocular excursion was excellent on both sides and in all directions, except as regards convergence which was markedly restricted, more so on the left side. The pupils were somewhat deformed, reacted to light but apparently did not react at all, or else very faintly, to accommodation and convergence efforts. There was no exophthalmos. Ophthalmoscopy revealed a rather pallid nerve-head on the right side; on the left, the disc was congested but there was no evidence of edema, no irregularity of outline and no measurable elevation. All around the periphery of the disc however were numerous linear or flamed shaped, radiating hemorrhages. There was a definite increase in the tension of the

globe. Urinalysis showed a low specific gravity, absolutely negative albumen reactions but a fair number of hyaline and finely granular casts. The systolic blood-pressure was 230 mm.

The patient was put on a suitable diet and given vaso-dilators and iodides. The intraocular tension rapidly increased however and he soon developed a severe glaucomatous condition which led the oculist to remove the eye, December 14, 1916, from fear of sympathetic ophthalmia. The operation was followed by considerable bleeding which was not definitely controlled until after 48 hours, but otherwise the patient recovered perfectly and has since then remained perfectly well. It may be objected that in this case as well as in the preceding one the presence of retinal hemorrhage does not warrant their utilization for the study of the problem under discussion but I have seen cases of choked disc with retinal hemorrhages resulting from intracranial tumor in which convergence and the pupillary reactions were intact.

Case VII. Mrs. J. C., age 40, married 13 years, no children, no miscarriages. Patient had the habit of frequently sewing during hours in the evening.

The condition in which we are interested had its onset about May 5, 1916, when the patient began to suffer daily from left sided headache located mainly in the fronto-temporal region. A few days later there appeared on the left lower eyelid a large stye which the patient herself opened with a sterile needle and from which two or three drops of thin pus were obtained. The headache, though not severe up to this time, gradually increased in intensity until May 25 when the patient began to have a series of almost daily vomiting spells The head pain became extremely severe and involved both frontal regions, the vomiting persisted and the total inability to eat coupled with insomnia soon determined a distressing state of exhaustion.

She was seen for the first time June 3 in consultation with her attending physician, Dr. Marcus T. Cronin of Albany, N. Y., and complained of blurred vision in addition to the above symptoms. Physical examination showed marked exophthalmos on the left side together with edema of the superior eyelid and undue whiteness of the sclera. Ocular excursion was somewhat limited in all directions on both sides and convergence practically impossible. All such tests were attended with considerable pain in and about the eyeball. No definite impairment of vision could be ascertained by means of ordinary rough tests, save that the patient complained of seeing very indistinctly objects brought close to the eyes. The pupils were perhaps moderately dilated, reacted promptly to light and not at all to accommodation efforts. There was definite photophobia on the left side. Ophthalmoscopy revealed fairly marked congestion of both discs, more severe on the left side and accompanied on this side by a slight degree of swelling. The Wassermann reaction was weakly positive. The patient was at once given intensive mercurial and iodide medication and all the symptoms practically disappeared in about two weeks. She has been seen and examined repeatedly since then and the findings were negative, save that a fair degree of convergence inadequacy has persisted.

Case VIII. Mrs. A. E. C., age 40, married, two children, no miscarriages, referred to me January 3, 1916, by Dr. Fred Myers of Albany, N. Y.

The history given by the patient was that she had suddenly lost her vision in the right eye, Sunday, December 26, 1915, and that since then she had suffered from considerable pain in the right forehead as well as within and behind the right eyeball. Within the last two days she had experienced difficulty in keeping the right eye open.

Physical examination showed definite exophthalmos on the right side as well as partial drooping of the eyelid, coupled, however, with a mild degree of blepharospasm which was practically constant. Lateral excursion of the eyeballs to either side was somewhat restricted and the same was true of elevation and depression. Upon attempts at convergence the left eye turned in somewhat, but the right eye remained stationary and it was further noted that the pupils reacted very slightly to accommodation and convergence efforts. The left pupil reacted actively to light, whereas the right pupil did so very faintly. The consensual reaction on this side however was relatively excellent. While adequate examination of the visual fields was not made by means of a perimeter, it was ascertained by more elementary tests that the patient enjoyed practically perfect vision in the left eye, whereas a gross deficit existed in the right eye. With this eye the patient was totally unable to see objects placed directly in front of her or toward the middle line, but could make out the general outline of objects placed towards her right, *i. e.*, in the temporal field. From this it was concluded that there was relative integrity of the nasal fibers. Ophthalmoscopy showed a normal eye-ground on the left side, whereas on the right, there was marked pallor of the disc as a whole and haziness and imprecision of its outline suggesting beginning edema. The Wassermann reaction was negative, but the patient was nevertheless administered rapidly increasing doses of mercury and iodide. Vision returned in the right eye after a few days and the pain greatly relieved.

The patient reported for examination, January 18, 1916, and it was found that ocular excursion was greatly improved in all direction except convergence which was now symmetrically defective. The right pupil reacted distinctly better to light and the patient apparently saw perfectly well with the right eye objects placed directly in front of her or in the temporal field but still retained much impaired vision in the nasal field. The right disc remained pallid, particularly in its temporal segment, and the corresponding edge was still fluffy and ill-defined. The patient was subsequently seen several times and careful examination showed that all her symptoms cleared up entirely except slight inadequacy of convergence and a residual pallor of the temporal segment of the right disc.

Case IX. J. C. L., male, age 29 years, single, traveling salesman. He was not carefully questioned regarding his habits, but denied venereal infection. Referred to me September 10, 1915, by an oculist with the diagnosis of choked disc and complete blindness in the right eye.

The history given was that the patient had suffered since two weeks from pains of a neuralgic character in the region of the right temple and orbit, that the eyeball was sore to the touch and that pain was much aggravated by moving the eyes in any direction. One week after the onset of these symptoms, he suddenly lost vision completely in the right eye and the condition had since then persisted.

Physical examination showed a very definite exophthalmos on the right side and unusual whiteness of the sclera. Ocular excursion was somewhat limited upwards and laterally on both sides, but there was no nystagmus. Convergence was practically nil. The right pupil did not react to light directly, but did react consensually. The left pupil yielded the opposite reactions to the light stimulus but apparently neither pupil reacted to accommodation convergence efforts. The visual field was nil on the right side and intact on the left. Ophthalmoscopy showed a perfectly normal fundus on the left side, whereas on the right side the optic nerve-head was edematous, the elevation of the disc being + 3, the veins about twice the size of the arteries and the disc outline hazy and imprecise. The sinuses were negative and the Wassermann reaction was negative.

That the actual optic nerve disturbances: amaurosis of sudden onset, loss of pupillary reflex and swelling of the disc, were not due to material interstitial implication of the retro-bulbar segment of the optic nerve, but rather to compression edema or perhaps to more or less severe vascular spasm following perineural exudation, would seem probable from the fact that under vigorous anti-specific medication the patient regained marginal light perception in less than ten days. I did not have the opportunity of seeing the patient again, but learned from the attending oculist that on September 18 the exophthalmos had practically disappeared and the temporal margin of the disc distinctly outlined, although there did remain a large central scotoma. October 2, 1915, the swelling of the disc had gone down one half and vision was 4/200. November 1st the disc was decidedly white and showed a large central excavation so that the lamina cribrosa was clearly visible. His improvement was constant and he rapidly regained normal vision though the persistent pallor of the disc suggested the development of secondary atrophy.

The symptomatology of the cases of unilateral retro-bulbar disease presents many features of considerable interest from the standpoint of physiopathology, particularly as regards the development of exophthalmos, the apoplectiform onset of blindness, the occurrence of retinal hemorrhages and the retention of the pupillary light reflex.

The pathogenesis of exophthalmos still remains unsolved and beyond the fact that it may be regarded as a manifestation of irritation of the cervical sympathetic, we actually know little or nothing of the mechanics of the symptom. It has recently been suggested that it is due to spasm of Müller's flat orbital muscle and doubtless

this is a factor of considerable importance in the milder grades of exophthalmos but can hardly account for the extreme degrees so frequently observed in Basedow's disease. Of course in the present series of cases the mechanical effect of the local infiltrating mass must naturally be considered although the extreme rapidity with which the exophthalmos disappeared warrants the conclusion that the degree of infiltration must have been very slight and in itself, therefore, of relatively little moment in the production of the symptom. In this connection, it may be remarked that we are in the habit of considering only the nerve-trunks derived from the brain-stem in discussing the various palsies and disorders of the ocular muscles and that we quite forget the fact that in their course through the cavernous sinus, the third, fourth and sixth nerves, like the ophthalmic division of the fifth, receive important filaments from the sympathetic plexus surrounding the internal carotid artery. There is a reason for this anatomic association and it is only logical to assume that these sympathetic fibers have a share in the innervation of the extrinsic ocular muscles even though the latter are of the cross-striated variety. It certainly cannot be maintained that these sympathetic fibers are all destinated to the smooth musculature of the orbit, for while the sympathetic supply of Müller's muscle in the superior eyelid is probably conveyed through the superior division of the motor oculi, the dilator pupillæ is supplied through the long ciliary nerves and Müller's flat orbital muscle through the infratrochlear nerve. Just what influence is exerted by the sympathetic upon the ocular muscles is naturally purely a matter of conjecture, but it is not unreasonable to suppose that it regulates the inherent tone within these muscles. If such is the case, irritation of the sympathetic may produce exophthalmos by putting on tension and approximating the various extrinsic ocular muscles with the result that forward projection of the globe necessarily follows. Symptomatology being largely the expression of functional imbalance, symptoms of deficit are coupled with symptoms of overactivity and this is particularly true in infiltrating lesions. The lesion incriminated in our cases incapacitating accommodation and convergence by reason of disability of the autonomic system (ciliary ganglion and its connections) gives rise to the exhibition of sympathetic hyperactivity manifested by exophthalmos and by more or less generalized though slight restriction of ocular excursion. The bilateral limitation of upward excursion of the eyeballs is a particularly interesting feature. In a lesion involving the ciliary ganglion which is attached to the oculomotor branch supplying the inferior oblique muscle, we might

legitimately assume a concomitant weakness of this muscle which in reality acts in conjunction with the superior rectus in elevating the eyeball, or we may possibly admit, as has recently been suggested by Eppinger and Hess,[8] that the levator palpebræ is partly supplied by the mid-brain antonomic through the ciliary ganglion and as this muscle works synergically with the superior rectus, the eyeball cannot be properly elevated whenever the innervation of the levator is disturbed as would naturally be the case in lesions of the ciliary ganglion. It will be noted that in practically all cases, even in those presenting positive evidence of unilateral retro-bulbar disease, *i. e.*, unilateral blindness and unilateral changes in the fundus (edema, hemorrhage), the disorders of muscular innervation were bilateral and essentially symmetric, namely the gross impairment of convergence, the less marked though definite restriction of lateral excursion and elevation. In other words, we must admit that lesions in the retro-bulbar tissues on one side are capable of determining changes (toxic degeneration or circulatory disturbances) in the corresponding structures of the opposite side, or else that certain functional processes demanding coördinate and synchronous bilateral motor activities are no longer possible the moment that team-work is disturbed or impaired. Of course it is possible that in these cases the lesions were bilateral but markedly unequal in severity.

The acute development of unilateral blindness in two of the cases has been attributed mainly to compression and anemia or edema of the optic nerve inasmuch as vision returned almost integrally within three or four weeks. The occurrence of retinal hemorrhages in two of the other cases is interesting as it throws some light upon the genesis of some intra-ocular hemorrhages of obscure origin. The oculist not infrequently sees instances of retinal hemorrhage in which no ascertainable cause is demonstrable. It is evident, of course, that in the presence of inherited or acquired though latent constitutional taints (syphilis, tuberculosis, arthritism, nephritis, etc.) infectious processes in the retro-bulbar tissues by interference with local circulation or by mechanical compression of the vascular trunks may occasion the rupture of degenerated capillaries.

The pains behind the eyeball, in the forehead and temple and even along the sagittal suture to the occiput are presumably due to irradiation, along the various branches of the ophthalmic division of the fifth nerve, of irritation emanating from the focal involvement of the ganglionic and ciliary filaments within the orbit.

[8] Eppinger and Hess, Vagotonia, Jour. of Nervous and Mental Disease, 1914, Vol. 41, No. 5, p. 320, and No. 6, p. 394.

The accommodation convergence paralysis syndrome is interesting more especially because it demonstrates the elective disability of the pupil and represents, as previously stated, the converse of the Argyll-Robertson pupil phenomenon. It is assumed that in those of our cases in which this syndrome was uncomplicated, the lesion involved the ciliary ganglion or else the afferent roots of this ganglion because it is generally admitted that ganglion cells and nerve endings are particularly susceptible to toxic agents. This localization may seem at variance with the observations of Anderson[9] who was unable to obtain contraction of the pupil to the light stimulus after extirpation of the ciliary ganglion in the cat. The data obtained through animal experimentation however are not always applicable to human physiology nor can the results produced by experimental extirpation be compared with the functional losses determined by spontaneously evolving pathological processes. It is not inferred that in our cases the lesion is a totally destructive one, but that it consists either of partial chromatolysis of the ganglion cells or of incomplete degenerative changes in the afferent root-fibers analogous to what has been described by Gombault and others under the name of segmental periaxillary neuritis This would imply nutritional deficit and consequent reduction, not complete suppression, of function, and this is borne out by the clinical evolution of the syndrome which in the great majority of cases is purely transitory, generally clearing up in the course of a few weeks or months. Moreover, all anatomists are not in accord regarding the histologic structure of the ciliary ganglion which, it is maintained, varies considerably in different animals. Retzius, Erchia, and Michel, working with the Golgi method, showed that this ganglion consists essentially of multipolar nerve cells identical with those of the gangliated cord and therefore consider it a sympathetic ganglion. This view is accepted by van Gehuchten[10] who has recently tabulated the results of different investigators on this subject. Schwalbe and Antonelli regard the ciliary ganglion as the analogue of the posterior spinal ganglion, while Krause considers it a mixed ganglion. Holtzmann says that its structure varies; in the chicken and rabbit the cells are similar to those of the posterior spinal ganglion, in the cat they are identical with those of the sympathetic ganglia, while in the dog both cell types are found. Reasoning on the basis of physiology and from clinical observation, it seems probable that in man all the cell-groups of the ciliary ganglion are not functionally equivalent and it is therefore possible that different

[9] Anderson, Journal of Physiology, 1904, Vol. 30, pp. 15–24.

[10] Van Gehuchten, Anatomie du Système Nerveux de l'homme, 1906, p. 619.

toxins exert a selective action upon different cell-complexes. Finally, it should be recalled that aside from the main ciliary ganglion, small ganglionic excrescences are to be found along the course of both the afferent and efferent branches of the ciliary ganglion; they have been called the accessory ophthalmic ganglia and perhaps the degenerative changes may be limited to these more minute and vulnerable structures. At any rate, that it requires considerable damage to the ciliary ganglion or its efferent nerves to abolish the pupillary light reflex is well shown by the behavior of the pupil in cases of retro-bulbar disease. It is a well known fact that in cases of unilateral blindness due to compression of the optic nerve within the orbit, the pupillary light reflex is much less impaired than vision and often persists until total blindness supervenes; furthermore if the lesion retrocedes or compression is relieved, the light reflex returns before definite improvement of vision becomes manifest. This point is well illustrated in two of the cases just reported (Cases VIII and IX) in which vision was entirely or almost entirely lost temporarily and in which coincident abolition or reduction of the direct light reflex on the affected side and of the consensual light reflex on the healthy side was observed. This implies greater resistance on the part of whatever fibers in the optic nerve constitute the centripetal path of the reflex arc, but it should further be remarked that under such circumstances the persistence of the consensual light reflex on the affected side indicates an even greater resistance on the part of the centrifugal path of the reflex arc, inasmuch as the causative lesion must necessarily involve either the ciliary ganglion or the ciliary nerves which actually surround the optic nerve and through which the centrifugal impulse is conveyed to the iris. It is therefore evident that both paths of the light reflex arc are exceptionally resistant to local disease, the centrifugal path even more so than the centripetal, and from all these facts the conclusion is warranted that the pupillary light reflex persists as long as any fibers still remain to ensure the impulse transmission. This same reasoning does not hold good with regard to the accommodation convergence pupil reaction which is part and parcel of a decidedly complicated physiological process. Accommodation is dependent upon contraction of the ciliary muscle which "by drawing on the ciliary processes, relaxes the suspensory ligament of the lens thus allowing the anterior surface of the lens to become more convex" (Gray). This is further accompanied, in accommodation at close range, by increasing convergence of the eyeballs. The execution of this highly coördinate and intricate act demands adequate sensory innervation of all the struc-

tures concerned, focal confluence of centripetal stimuli at the central sensory center, wherever this may be located, transmission of centrifugal impulse to the ciliary nucleus and final irradiation of motor innervation to all the peripheral structures taking part in the coördinate physical transformation. It is plain that any break in sensory transmission or in motor innervation will result in impairment of greater or lesser degree of the accommodation convergence reaction.

Peculiarly, both the isolated loss of the pupillary reaction to light (Argyll-Robertson phenomenon) and the isolated loss of the pupillary reaction to accommodation and convergence have been attributed to very limited lesions in some part of the oculomotor cellular column in the mesencephalon at the level of the sphincter nucleus or of the ciliary nucleus as the case might be. Not only is it difficult to admit the possibility of such minute and strictly elective localizations in as crowded an area of the mid-brain, but the fact is that corroborative anatomic data are, as far as I am aware, practically wanting. In progressive ophthalmoplegia due to strictly degenerative cellular changes in the nuclei of the ocular muscles, the intrinsic ocular musculature usually escapes and when it is involved there is no dissociation but simultaneous loss of pupillary reaction both to light and to accommodation convergence efforts. Being greatly interested in this whole question of pupillary disorders, I have recently examined by means of serial sections this entire region in two cases of tabes with uncomplicated Argyll-Robertson pupil phenomenon and failed to detect any material alteration of the cells or fibrillar network at any level of the oculomotor nucleus.

In explaining the pathogenesis of the Argyll-Robertson pupil, some authors (Bumpke, Higier[11]) have been led, on purely theoretical grounds, to localize the lesion at or near the anterior border of the anterior colliculus, *i. e.,* in the course of the supposed fibers derived from the optic tract and which pass in front of the external geniculate body and through the brachium anterius to end about the constituent cells of the sphincter nucleus in the most anterior segment of the oculomotor cellular column. The fact is that these connecting fibers have never been actually followed from the optic tract to the oculomotor nucleus except by Bernheimer and a direct path is not admitted by most anatomists. Moreover a lesion at this point would involve only the centripetal fibers of homologous retinal segments and give rise to the hemianopic type of pupillary reaction disturbance and this would not at all explain what occurs in cases of unilateral Argyll-Robertson pupil phenomenon in which both direct

[11] Higier, Journal of Nervous and Mental Disease, 1917, Vol. 45, No. 1, p. 63.

and consensual light reflexes are abolished on one side and preserved on the other. This would seem to prove that the lesion, wherever it is, involves the centrifugal and not the centripetal path of the pupillary light reflex arc. In this connection finally and most important of all is the significant fact that lesions limited or practically limited to the corpora quadrigemina have very rarely been accompanied by loss of the pupillary light reflex. A number of such cases have been collected and carefully summarized by Spiller.[12]

Marina[13,14] who has done much excellent work on the anatomy and physiology of the ciliary ganglion, places the causative lesion of the Argyll-Robertson pupil in this body. He claims to have observed chromatolytic changes in the cells of the ciliary ganglion or degenerative processes in the short ciliary nerves in several cases of tabes and general parésis in which this symptom was present and to have found changes only in the homolateral ganglion whenever the phenomenon was unilateral. Recently, André Thomas[15] has reported three cases of tabes with uncomplicated Argyll-Robertson phenomenon in which the ciliary ganglion as well as the roots derived from the motor oculi and the nasal nerve, and also the short ciliary nerves as far as their penetration into the eyeball were all found to be practically normal, thus apparently disproving Marina's contention. Thomas admits however that inasmuch as the ciliary nerves were not examined in their intra-ocular course, his cases do not serve to absolutely exclude a lesion of these nerves as the underlying cause of the Argyll-Robertson pupil phenomenon, but they certainly do prove that this symptom may occur independently of any lesion of the ciliary ganglion. The findings of Thomas are of extreme value for while they by no means invalidate the assumption that the pupillary light reflex is dependent upon at least partial integrity of the ciliary ganglion they do eliminate the hypothesis that the Argyll-Robertson pupil is due to a primary lesion of this structure. The probability is that Marina, working with Nissl's method, did observe chromatolytic changes in the cell complexes of the ciliary ganglion, but they may have been due to retrograde degeneration, *i. e.*, nuclear reaction resulting from primary disease of some of the short ciliary nerves within the eyeball. Reichardt[16] has ascribed the Argyll-Robertson

[12] Spiller, Tumors and other lesions of the brain, in Posey and Spiller's "The Eye and Nervous System," Philadelphia, 1906, p. 404.

[13] Marina, Das Neuron des Ganglion Ciliare und die Centren der Pupillenbewegungen, Deutsche Zeitschrift für Nervenheilkunde, 1899, pp. 356-412.

[14] Marina, Anali di Neurologia, 1901, XIX, p. 209.

[15] Thomas, Etude sur les Nerfs ciliaires, Nouvelle Iconographie de la Salpêtrière, 1910, No. 5, p. 562.

[16] Reichardt, Das Verhalten des Rückenmarkes bei reflectorischer Pupillenstarre, Arch. für Psych., 1904, Vol. XXXIX, f. 2, p. 324.

phenomenon to degeneration of the ventral intermediate zone of Bechterew, or comma-shaped tract of Schultze, between the second and sixth cervical cord segments. In a series of thirty-five cases of tabes and general paresis presenting all possible combinations of pupillary disorders and disturbances of the tendon reflexes, the involvement of the comma-shaped tract was a constant feature. In one case of general paresis in which the Argyll-Robertson phenomenon represented the only spinal symptom, an isolated degeneration of this tract was observed whereas in a case of tabes without Argyll-Robertson pupil this tract was uninvolved despite the otherwise extensive sclerosis of the posterior-columns. Other observers however have failed to find any degeneration at this level of the cord in cases of isolated loss of the pupillary light reflex and cases of cervical tabes have been encountered in which this reflex was intact.

It is generally admitted that the pupillary light reflex is due to active stimulation of the sphincter nucleus and that the stimulus is transferred directly or indirectly from the optic nerve endings at the level of the external geniculate body and anterior colliculus to the most anterior segment of the oculomotor cellular column. On the basis of the close anatomic relations of these various structures, this represents the simplest and most plausible explanation of the reflex phenomenon, but it may be seriously questioned whether the light reflex is not due rather to active inhibition of Budge's cilio-spinal center, or more correctly of the bulbo-spinal sympathetic centers. We know that strong sensory stimuli of all kinds, namely pain, pinching of the skin, faradization, strong irritation of the trigeminal, orgasm, etc., cause a reflex dilatation of the pupil and theoretically light flashed into the eye should have the same effect were it not for the necessity of protecting the sensitive retina from such harmful influence. Thus interpreting this difficult problem, the light perception would bring into activity a center for the inhibition of the sympathetic dilator nucleus, so that the contraction of the sphincter of the iris would be purely passive and result from sudden rupture of the usual innervational equilibrium. Such inhibition centers have been assumed to exist with much reason by many observers though their exact location remains in doubt, the only available data being those obtained as the result of animal experiments according to which a center for the inhibition of both the contraction and the dilatation of the pupil would exist near the spinal end of the floor of the fourth ventricle in the proximity of the fasciculus solitarius. In his experiments on cats, Bach[17] showed that reflex iridoplegia only

[17] Bach, Ueber die reflectorische Pupillenstarre und den Hirnrindenreflex der Pupillen, Neurologisches Centralblatt, 1903, No. 23, p. 1090.

occurred when section was practised at a given level in this region. Bach's conception has been much assailed and criticized but a number of extremely valuable and instructive cases have been reported within the last few years which serve to substantiate his views and more especially to justify the assumption that the bulbo-spinal sympathetic centers are themselves under the control of a descending central sympathetic tract, probably derived from the hypothalamus, and conveying either activating or inhibitory impulses, and more probably both. This hypothesis moreover is in full harmony with the results obtained by Karplus and Kreidl[18] in their animal experiments. These authors by electrical stimulation of the floor of the third ventricle lateral to the infundibulum determined in cats a series of interesting sympathetic phenomena and more particularly mydriasis and widening of the palpebral fissure and disturbances of the function of the bladder and sweat glands. The cases of syringomyelia or syringobulbia reported by Dejerine and Mirallié, by Rose and Lemaitre,[19] by Sicard and Galezowski,[20] in which Horner's oculo-pupillary syndrome was accompanied by homolateral or heterolateral Argyll-Robertson pupil phenomenon, and other cases reported by Guillain, Rochon-Duvigneaud and Troisier,[21] by Dejerine, Pellissier and Lafaille,[22] by Langelaan,[23] in which circumscribed pontine or peduncular lesions gave rise to a unilateral Argyll-Robertson pupil, all demonstrate that the Argyll-Robertson phenomenon, in these cases at least, was due to involvement at varying levels of the central connections of the sympathetic and furnish a strong argument in favor of the hypothesis just advanced that the normal light reflex probably does not depend upon active and direct stimulation of the oculo-motor nucleus. This evidently does not mean that the light reflex does not require for its production a normal innervation of the sphincter muscle, but this is possibly already assured by the neuron derived from the ciliary ganglion.

At any rate, whether we admit that the light reflex is due to

[18] Karplus and Kriedl, Gehirn und Sympathikus, Pflüger's Arch., Bd. CXXIX and CXXXV.

[19] Rose et Lemaitre, Deux cas de Syringomyélie avec Signe d'Argyll-Robertson, Revue Neurologique, 1907, No. 24, p. 1300.

[20] Sicard et Galezowski, Syringomyélie avec Syndrome de Horner et Signe d'Argyll-Robertson, Revue Neurologique, 1913, No. 15, p. 105.

[21] Guillain, Rochon-Duvigneaud et Troisier, Le Signe d'Argyll-Robertson dans les lésions non syphilitiques du pédoncule cérébral, Revue Neurologique, 1904, No. 8, p. 449.

[22] Dejerine, Pélissier et Lafaille, Syndrome de Claude Bernard-Horner et Signe d'Argyll-Robertson unilatéral d'origine vraisemblablement pédonculaire, Revue Neurologique, 1914, No. 14, p. 119.

[23] Langelaan, Sur cas d'hemiatrophie faciale avec signe d'Argyll-Robertson contralateral, Revue Neurologique, 1913, No. 21, p. 520.

active stimulation of the sphincter nucleus or to active inhibition of the sympathetic dilator nucleus, inhibitory relaxation of the dilator pupillæ certainly occurs and this implies an associated engorgement or distention of the iridian blood vessels. While the state of the iridian blood vessels is of little moment in active contraction of the sphincter accompanying convergence and other definite movements of the eyeballs, it is believed that it does play a significant rôle in the purely reflex excursion of the iris occurring in pain mydriasis and in the pupillary light reaction. In fact, the study of the pupillary light reflex and its disorders almost gives one the impression that this reflex is largely a vascular or vasomotor phenomenon. While it is not maintained that this is the case, there are some excellent arguments in favor of this view such as the abolition of the light reflex in syncope, during the epileptic attack, perhaps in certain hysterical attacks, in cases of extreme fear or fright, in conditions of profound physical exhaustion and in certain toxic states. In most of these conditions we must admit the existence of decided perturbation of vascular innervation. Again it may be recalled that a true Argyll-Robertson pupil has been observed in connection with aortic aneurism and as a transitory manifestation in the early stages of some cases of syphilis during the full evolution of the cutaneous eruptions and independently of any demonstrable evidence of central nervous disease. From all these considerations it seems difficult to avoid the conclusion that the light reflex is a purely sympathetic phenomenon and that its disappearance is linked essentially with lesions affecting either the central connections of the sympathetic or certain peripheral portions of this system. In alluding to the various cases recently reported in which the Argyll-Robertson pupil occurred in connection with lesions situated either in the medulla or in the pons, it was assumed that the phenomenon resulted from involvement of the central sympathetic fibers, but in these various cases there existed other combinations of symptoms not seen in tabes dorsalis and general paresis and it is therefore doubtful if the Argyll-Robertson pupil in these two conditions can be ascribed to foci of disease in the brain-stem. There are valid reasons for believing that on the contrary the lesion may be situated in the iris itself and consist of degenerative changes involving more particularly the sensory endings and the sympathetic filaments supplying the vascular network. Two important features associated with the Argyll-Robertson phenomenon strongly militate in favor of this view, namely the almost invariable deformity of the pupil which becomes oval or quadrangular, and the evident degeneration of the iridian

tissue which loses its luster and its characteristic radial furrows and ridges. The frequent occurrence of the latter finding was signalized by Dupuy-Dutemps[24] several years ago but has not attracted sufficient attention. This author has justly insisted that this peculiar atrophy of the iris clearly indicates a lesion of the peripheral trophic neuron and believes that the underlying process is a slow degeneration of the short ciliary nerves. The later disappearance of the pupillary response to accommodation and convergence efforts, far more common in tabes and general paresis than is generally admitted, would strongly argue in favor of this hypothesis, inasmuch as the gradual extension of the degenerative process would in time abolish all pupillary reactions. There are so many cases, however, in which the Argyll-Robertson pupil remains uncomplicated throughout and in which the myosis persists that it seems difficult to admit a diffuse degeneration of the short ciliary nerves and this is my reason for supposing that the vascular filaments are mainly degenerated. The persistence of the accommodation reaction and the occasional occurrence of mydriasis instead of myosis afford some evidence that neither the sphincter nor the dilator of the iris is paralyzed in the strict sense of the word in the Argyll-Robertson pupil phenomenon.

While the foregoing and rather lengthy discussion of the pathogenesis of the Argyll-Robertson pupil may not seem to properly belong within the scope of an article devoted to the accommodation convergence paralysis syndrome, it nevertheless seemed desirable to incorporate these facts inasmuch as they serve fairly to complete the survey of recently acquired data concerning the innervation of the pupil, and likewise facilitate the interpretation of the facts observed in the various cases reported in this paper. It is plain that the pupillary light reflex and the accommodation convergence pupillary reaction are not determined by centrifugal impulses travelling along the same fiber-path and that each phenomenon is dependent upon the association of given cell-complexes and fiber fasciculi. In other words, it is believed that not only in the ciliary ganglion but also in its afferent roots and efferent branches, a true differentiation of cell groups and nerve fibers exists and that in this way independent and specific anatomo-physiologic combinations are assured. There is indeed no reason to believe that in the reflex contraction of the pupil to the light stimulus coincident contraction of the ciliary muscle takes place and we must admit that only given cell complexes

[24] Dupuy-Dutemps, Sur une forme spéciale d'atrophie de l'iris au cours du tabes et de la paralysie générale, Annales d'Oculistique, September, 1905, and Congres d'Ophthalmologie de Paris, 1906.

in the ciliary ganglion and given fasciculi in its afferent and efferent branches are brought into activity.

In all the cases included in the present communication, the symptoms had an acute onset and followed either evidence of general infection or toxemia or else actual infectious processes about the orbits and nasal fossæ. The symptoms in all cases were strictly local and repeated neurological examinations failed to disclose any sign of involvement of the cerebro-spinal axis. There can hardly be any doubt therefore that the symptoms observed were dependent upon pathological changes within the orbit. This does not mean that infiltration at the sphenoidal fissure and optic foramen cannot materially interfere with the vascular and subarachnoidean exchanges at the base of the brain and thus determine secondarily more or less functional disturbance referable more particularly to the interpeduncular space and acoustico-cerebellar recess.

The nature of the infection in these various cases is difficult to even tentatively establish. In all of them, with one exception, the Wassermann reaction was negative which naturally did not exclude syphilis, and, as was seen in some of the cases, active antisyphilitic medication was followed by prompt and marked improvement. Even this, however, is not proof positive that the nature of the lesion was syphilitic. In some of the cases specific medication yielded absolutely no results and the condition either remained stationary or cleared up apparently under other forms of treatment. One fact which remains to be noted in this connection is that several of the cases occurred either at the beginning or towards the end of the epidemic of poliomyelitis in our territory and that some of these patients actually lived in districts from which cases of poliomyelitis were known to have been reported. It occurred to me that these ocular syndromes might possibly represent another clinical modality of poliomyelitis which we now have reason to believe may affect almost any part of the nervous system. There is a growing belief that herpes zoster may be due to the virus of poliomyelitis and if this proves to be the case, there will be little reason to suppose that the sympathetic ganglia are not equally susceptible. Perhaps it will soon be shown that poliomyelitis affects adults far more frequently than is generally supposed, but that it elects different localizations and presents itself under the clinical picture of diseases which at the present time are not considered to bear any relationship to poliomyelitis. The localization of nervous disease is conditioned by a number of factors of which regional functional exhaustion is unquestionably one of the most important. It will be noted that in

most of our cases, the occupation or avocation of the patient was such as to throw undue and persistent strain upon the accommodative apparatus.

In conclusion, it may be stated that while foci of disease involving the brain-stem and more particularly the region of the Sylvian aqueduct and corpora quadrigemina undoubtedly do produce, usually along with other symptoms, the accommodation convergence paralysis syndrome, there seems to be little ground for the assumption that this syndrome, occurring as an isolated and purely transitory clinical manifestation, is due to an elective central localization. The fact that this syndrome develops after a number of infectious and toxic states known to give rise essentially to lesions in the peripheral nerves, and that it likewise follows local infectious processes about the orbit and nasal fossa, appears to me to justify the belief that it is dependent upon degenerative changes involving either the ciliary ganglia or their immediate connections.

CEREBROSPINAL FLUID TESTS, ESPECIALLY THE GOLD REACTIONS IN PSYCHIATRIC DIAGNOSIS*

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Introduction

The value of the examination of spinal fluid withdrawn by lumbar puncture from insane patients has been thoroughly proved in many hospitals. The refinements in the technique of old tests and the new tests added have, in the last five years, given to the examination of spinal fluid the first place in the diagnostic laboratory of the insane hospital.

The early tests of clinical application were relatively simple. For many years cyto-diagnosis, globulin tests and inspection were the main reliances. The first great step in advance was the application of Wassermann's method to the spinal fluid. At first 0.2 c.c. of fluid was used. This did not give a very high percentage of positive results, and later the amount was increased to 1.0 c.c. Using this quantity, very many more positive results were obtained in paresis with the result that the test became of great importance Plaut's (21) monograph was a very great stimulus. In the meantime, the protein tests and methods for cell counting have been elaborated. Finally, in 1912, came Lange's test, the gold sol reaction, which is of differential value.

The literature dealing with the technique and results of tests on the spinal fluid is of enormous volume. This paper makes no attempt to cover this; only those articles bearing directly on the questions immediately at hand are here considered.

The various methods used from time to time in this laboratory are considered in some detail. All tests here reported (save the Wassermann reaction) have been performed by myself or under my direct supervision, hence my responsibility for them is complete. The diagnoses in all cases were determined by the assembled staff

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after all data were at hand. It may be stated that no question of personal bias could enter into the interpretation of results, since no "provisional diagnosis" accompanies the specimens to the laboratory.

A portion of the tabulation of results was done for me by Mr. G. A. Clark, interne in the hospital, summer of 1915, to whom I hereby express my thanks.

Methods

1. *Wassermann Test.*—All tests are performed in the testing laboratory of the department of disease of the nervous system, Harvard Medical School, now the Wassermann Laboratory of the State Board of Health. For details concerning the method, the papers of Southard (28) and Lowrey (15) may be consulted. It is only necessary to state that the fluid is used in the amount of 1 c.c., and that a cholesterin fortified antigen and extract of syphilitic fetal liver were used. Various objections to the use of 1 c.c. of spinal fluid in the test have been urged, notably that in this way many will be found positive which are not really so. Further, using 1 c.c. the differentiation between paresis and cerebrospinal lues according to Plaut's findings is rendered impossible in a large majority of cases. As will be shown in the later discussions, positive tests in the spinal fluid with this method were found in very few cases in which syphilitic mental disorder was not directly indicated by other examinations. Hence, the method can be said to serve its purpose very reliably.

2. *Cell Counting.*—The earliest method in use was the centrifuge method of the French workers, introduced by Widal and Ravaut. The objections to this were obvious and serious. The first advance toward greater accuracy was the introduction of an ordinary blood-counting chamber. Then Fuchs and Rosenthal introduced the special chamber having their name, which is 0.2 mm. deep and 4 mm. square, giving a volume of 3.2 cu. mm.

In the first American report on the examination of cerebrospinal fluid from the insane by Cornell (1) this method was used. In the following year, Cotton and Ayer (2), working in this laboratory, made use of the Alzheimer method. They criticized the Fuchs-Rosenthal method, on the basis of a large error where there are only a small number of cells, and on the fact that a good differential cannot be made. They regard the Alzheimer method as the best of all, as it allows a good differential and fair quantitative count.

Donald (3) has described a drop-method for counting the cells, which at the same time gives permanent stained preparations. This method promises to be of real service and the technique is relatively simple.

In all of the cases here reported, the Fuchs-Rosenthal method was used. All objections to the contrary notwithstanding, the method is simple, does not consume an inordinate amount of time, and the results are accurate within reasonable limits—probably more accurate than any other method yet devised.

The stain originally recommended has been replaced in this laboratory by polychrome methylene blue. The spinal fluid gets to the laboratory within an hour of its withdrawal. It is agitated to make sure of even distribution of the cellular elements. Stain is drawn to the mark 0.1 in an ordinary leucocyte pipette, and then spinal fluid to mark 11. This is mixed and the pipette laid aside for 20–30 minutes. It is then shaken thoroughly (2 minutes); the first two drops rejected and the third mounted in the counting chamber. After a few minutes, the entire field is counted with an 8 mm. lens. A 4 mm. lens cannot be used, and a 16 mm. lens does not give a sufficient magnification. Two preparations are counted, and if these vary greatly a third. The number of cells in one slide multiplied by $\frac{101}{320}$ gives the number of cells in 1 cu. mm. Simple calculation will show that dividing the number in one slide by 3 is usually within 1–2 cells of the more accurate mensuration.

Using the 8 mm. lens allows differentiation in the counting chamber. Small and large lymphocytes, polymorphonuclear leucocytes, plasma cells and cells of the endothelial series are usually readily differentiated.

It is true that for thorough differentiation of cells and for a complete comparative study of the cellular elements, the methods of Alzheimer or Donald should be used. Henderson and Muirhead (7) have used Alzheimer's method, cutting frozen sections with success. Klien (12) has partially reported cell studies by the sedimentation method.

But for practical clinical purposes we feel that the Fuchs-Rosenthal method is decidedly the best quantitative method. It would, however, seem desirable to use some better qualitative method in conjunction with it.

3. *Globulin Tests.*—According to Cornell (1) the earliest test used for clinical purposes was performed with saturated solutions of magnesium sulphate. This has been entirely replaced by ammonium sulphate. Phase I of Nonne (20) consists of mixing equal parts of a solution of ammonium sulphate, saturated by heat and allowed to cool, and spinal fluid. A normal fluid will show no change, while a pathological fluid will show opalescence or marked turbidity within 3 minutes.

Fully as delicate and more easily read is the ring test of Ross and Jones (22). In this, 1 c.c. of spinal fluid is carefully floated on 2 c.c. of a supersaturated solution of ammonium sulphate. A thin gray plate (hair-line) occurring within 3 minutes is a sign of excess globulin. As a rule the plate forms immediately. Occasionally it forms after an hour or more. Such delayed tests are of doubtful significance. (The majority of negative fluids will show a little flocculent precipitate near the junction line in 12–24 hours. This is of no significance so far as I have studied it.)

Noguchi (19) introduced the butyric acid test carrying his name. Boil 0.2 c.c. of spinal fluid with 1.0 c.c. of a 10 per cent. solution of butyric acid in 0.9 per cent. sodium chloride solution: add 0.2 c.c. of 4 per cent. sodium hydrate solution and boil again. Fluids containing a considerable excess of globulin will show a precipitate in a very short time, while others may require 1–2 hours for it to develop. The results are read at the end of 2 hours. A flocculent precipitate is evidence of globulin excess; if there is only opalescence without precipitate, the result is recorded as negative.

Kaplan (10) introduced a test combining butyric acid and ammonium sulphate and designed to give an estimate of the quantity of globulin in the fluid. The technique is as follows: Heat 0.5 c.c. of spinal fluid until it boils up twice; add 3 drops of a 5 per cent. solution of butyric acid in normal saline and flow 0.5 c.c. of a supersaturated solution of ammonium sulphate under the fluid in order to obtain a contact zone. An excess of globulin is manifested by a thick, granular, pot-cheese-like ring. "If no granular thick ring forms, the fluid may be regarded as normal." If the ring is found, then 4 tubes receive 0.1, 0.2, 0.3 and 0.4 c.c. of spinal fluid respectively; the amount is made up to 0.5 c.c. with distilled water and the procedure of the first tube followed. Read at the end of 20 minutes.

The Kaplan test was in use for a time, but for more than a year the Noguchi and Ross-Jones tests have been used for determination of globulin excess.

4. *Albumen.*—Myerson (18) introduced to American literature the Mestrezat test for albumen. The test as performed in this laboratory has been slightly modified in the direction of greater precision.

The smallest tubes are picked out of a lot of 1 × 6 cm. tubes. Those in which 1 c.c. of water rises 18–20 mm. are kept aside for the albumen test. (It would be an advantage if these were flat bottomed, which mine are not.) In one of these tubes, heat 2.0 c.c.

of spinal fluid just short of the boiling point (at this point many pathological fluids become cloudy) and add 0.2 c.c. of a 33⅓ per cent. solution of trichloracetic acid. There is some ebullition and the fluid becomes opalescent to a varying extent. In a short time a flocculent precipitate begins to form. At the end of two hours, when the reading is made, the precipitate will usually be firmly packed in the bottom of the tube. A normal fluid will show not over 1/10 of the height of the column to be made up of precipitate.

5. *Colloidal Gold Test.*—In the three years since Lange (13) introduced this test, a relatively voluminous literature has grown up, and the test has firmly established itself as a standard. It is delicate, and, within limits, differential.

The theoretical basis for its application lies in the work of Zsigmondy (cf. Lange, 13) who showed that: albuminous bodies + electrolyte + colloidal gold causes a clumping of colloidal particles and various changes in color and even precipitation. If the albumens are less concentrated, then a protective action is exerted which prevents precipitation. The point at which protection ceases varies with different albumens.

Lange applied the test to spinal fluid after experimenting with sera. He found that if he reduced the salt content to 0.4 per cent., holding the globulins and nucleoproteids in solution, he obtained certain changes in cerebrospinal fluid of paretics, tabetics and cases of cerebrospinal syphilis. He also found that other nervous affections either gave no reaction or else the reaction was in a different zone. The reaction in paresis he regarded as pathognomonic, that in tabes and cerebrospinal syphilis as definitely syphilitic, but not pathognomonic.

The most difficult part of the test is the preparation of the gold reagent. Various slight modifications have been proposed from time to time. The procedure outlined below is the one which has best served this laboratory, and is in the main the method outlined by Weston, Darling and Newcomb (29).

The variations from this method (all of which have been tried in this laboratory) are also noted. The important thing to remember is that no method will give absolutely uniform results, for reasons which I am unable to state.

Utensils.—Jena beaker of 1,000 c.c. capacity; all glass distilling apparatus (use a plain cork to stopper the distillation flask) with no rubber in contact with steam or water; Jena flasks for stock solutions; small Jena glass beakers; accurate 5 c.c. pipettes. This glassware (as well as that used in setting up the tests, and for

spinal fluid examinations in general) should be cleaned in nitrohydrochloric acid, followed by thorough washing in freshly distilled water, boiling in distilled water, rinsing with double-distilled water and drying in hot air sterilizer. The flasks and beakers may with advantage be steamed according to the method outlined in Cohen's Physical Chemistry (30). The glassware must be absolutely clean.

Materials.—Gold chloride, c.p. (Merck), 1 per cent. stock solution in double-distilled water. Potassium carbonate, c.p. (Baker's analyzed), 2 per cent. solution made at time of using in fresh double-distilled water. Formalin (Baker's analyzed); stock solution in double-distilled water, 1 per cent. (it does not seem necessary to have the content 1 per cent. of formaldehyde; a mixture of 1 c.c. of the formalin solution and 99 c.c. of water is used). Stock solution of 10 per cent. sodium chloride, c.p., in double-distilled water.

Fresh double-distilled water. The water still in this laboratory is all metal. Freshly distilled water is then re-distilled in glass. (The Allihn type of condenser is the best of those tried.) The water must be used on the same day it is distilled for the second time. At times it seems that a third distillation might be in order.

To make the reagent, take 500 c.c. of fresh double-distilled water. Heat over a double Bunsen burner or small gas stove to approximately 60° C.; add rapidly 5 c.c. of the 1 per cent. gold solution and 5 c.c. of the 2 per cent. potassium carbonate solution. Heat rapidly to 90° C.; turn off the flame, and add rapidly, drop by drop, while agitating the solution, the 1 per cent. formalin solution. *Stop adding the formalin when the reagent is of the proper color.* This should not take more than 5 c.c. of the formalin solution, and usually takes less.

The reagent should be a dark red, clear by both reflected and transmitted light, should have a slight blue hue at the edges, and should have not more than a trace of golden shimmer by reflected light. Purple, light blue, dark brown, or light yellow murky fluids should be discarded.

It is not always possible to secure a perfect reagent, but within certain limits, variations in the reagent are permissible, provided only that such variations are noted and their significance known. Thus there may be some turbidity, chiefly yellowish, and the reagent be not perfectly transparent. Minor variations in the red color are also permissible, but light red reagents should never be used.

The method outlined above or any of those given below will procure good reagents the major portion of the time, but we have not been able by any method to produce a perfect reagent or even a

usable reagent at every trial. Visits to other laboratories have shown that they have the same trouble. One defect in the published reports on the use of the gold sol is that the factor of variation in response due to minor variation in the character of the reagent has received practically no attention. This is a freely admitted defect in the present report.

Variations in Technique.—Grulee and Moody (6) first add gold and carbonate, heat until the first steam bubbles appear, add 5 c.c. of 1 per cent. formalin solution and shake vigorously.

Jaeger and Goldstein (8) also follow this, which is the original Lange technique. They use water which has been three times distilled. Kaplan (9, 10, 11) adds the potassium carbonate to the water, heats one minutes, adds 5 c.c. gold and heats until the first bubbles appear. At first he used 3.75 c.c. of 1 per cent. formalin, but later recommended the use of 5 c.c. of 0.75 per cent. formaldehyde (from the context it is not clear whether this is 0.75 per cent. formaldehyde or formalin solution). This is added gradually with constant shaking. Flesch (4) follows Lange, using water, three times distilled. Lee and Hinton (14) pointed out that by the original technique it was difficult to obtain a series of good reagents. They add the gold and potassium carbonate at 60° C. and heat until the small bubbles arising throughout the fluid disappear (1–2 minutes boiling). They then add 5 c.c. of 1 per cent. formalin solution and shake vigorously. Weston, Darling and Newcomb heat to 60° C., then add the gold and potassium carbonate, then heat to 90° C. Add slowly and with constant agitation 5 c.c. of solution having 1 per cent. formaldehyde content.

All agree that the reagents must be of the highest purity, the water fresh and pure; the glassware absolutely clean. Any of the methods gives good results; though Glaser (5) is frankly critical and does not believe the test yields information of sufficient value to repay one for the time and materials used on the test.

To test:

Apparatus—Test-tubes.—Clean test-tubes, of good glass, 1.5 × 12 cm. Test-tube racks with ten holes in a row. One c.c. pipettes graduated in 0.01 c.c.; 10 c.c. pipettes graduated in 0.1 c.c. Jena beakers.

The 10 per cent. NaCl stock solution is diluted with fresh double-distilled water to 0.4 per cent. strength. Ten tubes are set up. In the first place 1.8 c.c. of the salt solution, in each of the others 1 c.c. Add 0.2 c.c. of spinal fluid to the first tube, mix thoroughly and transfer 1 c.c. to the second tube; mix thoroughly and transfer 1 c.c. to the third tube, and so on through the series of 10 tubes.

Throw away 1 c.c. from the last tube. Now add 5 c.c. of the gold reagent to each tube, mix thoroughly and set aside. Indications of the reaction may be seen in a short time but the readings are best made in 12–24 hours. The color changes are usually given as follows: 1 = red-blue and blue-red; 2 = purple; 3 = blue and violet; 4 = steel gray or blue gray; 5 = clear, with a bluish sediment at the bottom of the tube.

A paretic fluid will usually give a reaction somewhat as follows:

55555 43^{100}

This is what Kaplan has called the step-ladder curve. In tabes the reaction varies. It may be similar to the paretic curve (these are often cases of tabo-paresis): the reaction may take place in the first five tubes, but none be completely decolorized, or the first one or two tubes may be unchanged and the next two or three completely decolorized. A critical survey of the literature convinces me that cerebrospinal syphilis cases react in much the same way. That is, the gold reaction does not sharply differentiate between paresis, tabes and cerebrospinal syphilis in a certain proportion of cases.

The first five tubes constitute the so-called syphilitic zone. In cases of brain tumor when there is any reaction, it is usually in the third, fourth, fifth and sixth tubes, with maximum in fourth and fifth. Since we have had no experience with tuberculous and purulent meningitis, it is only necessary to state that the reaction is said to occur in still higher dilutions.

As will be seen by a glance at the tables, not every case gives a "5" reaction. Our standard here has been that if there was a change of "3" or more in three or more tubes the test was positive. If no tube showed a change as high as three the test was considered negative. If only one or two tubes showed a considerable change, the test was repeated, in order to rule out technical error.

A great many non-paretic cases will show changes of "1" or "2" in some tubes. While such tests are negative, a question arises concerning their interpretation. They may, of course, be an expression of the "gold number" for the particular protein in that spinal fluid, as has been suggested, but to my mind they are better explained by variations of minor degree in the reagent. This explanation seems to me to be borne out by our experience in repeated tests of the same sample of fluid with different gold reagents. Thus we have found that a fluid giving a minor grade of reaction with one reagent would give none with a slightly better one.

Table I

Results of Cerebrospinal Fluid Tests

This table includes all cases reported on in the paper

General Paresis

Case No.	Sex	Wass. R.		Alb.	Globulin			Cells	Gold		Remarks
		Bl.	Fl.		Kap.	Nog.	R.-J.		12345	678910	
18097	F.	p.	p.	...	p.	...	...	225	44443	32200	
18089	M.	p.	p.	...	p.	...	...	155	45554	44310	
18128	M.	p.	d.	...	p.	...	...	150	55555	55210	
18142	M.	p.	p.	...	p.	...	...	95	55555	55511	
18140	F.	p.	p.	...	p.	...	...	64	00045	55400	
18168	F.	p.	p.	...	p.	...	...	69	55555	53100	
18169	F.	d.	p.	...	...	...	...	26	33322	22000	Blood.
18160	F.	d.	p.	...	p.	...	...	15	55555	53200	
18165	M.	p.	p.	...	p.	...	...	10	23454	42000	
17560	M.	d.	p.	...	p.	...	...	90	11553	30000	
18185	M.	p.	p.	...	p.	...	...	71	55553	30000	
18087	M.	n.	p.	...	p.	...	p.	105	45555	31000	
18200	M.	n.	p.	...	p.	...	p.	60	55555	55310	
18244	M.	n.p.	p.	...	p.	...	p.	60	55555	55410	
18271	M.	d.	p.	...	...	...	p.	56	55555	44000	
18258	M.	p.	p.	...	...	...	p.	21	55555	53000	
18310	M.	d.	p.	...	p.	...	p.	25	55555	55300	
17550	F.	o	p.	...	p.	...	p.	...	55555	55320	Post-mortem.
16555	M.	o	p.	p.	p.	...	p.	...	55555	55300	Post-mortem.
16691	M.	p.	p.	p.	p.	...	p.	40	55555	55422	
18340	F.	o	p.*	p.	...	...	p.	...	55555	54440	* Chol. antig. only: post-mortem.
15589	F.	p.	p.	n.	n.	...	p.	9	00234	32100	
16454	M.	p.	p.	p.	p.	...	p.	22	01233	32200	
18382	M.	p.	p.	p.	p.	...	p.	37	54444	44200	
18391	M.	p.	p.	p.	p.	...	p.	15	45555	55544	
18434	M.	p.	p.	p.	...	p.	p.	30	11333	30000	
16564	M.	d.d.d.	p.	p.	...	p.	p.	60	02333	21000	
17878	F.	p.	p.	d.	...	n.	p.	122	13331	10000	
13526	F.	p.	d.	p.	...	p.	p.	...	33344	33200	
18463	M.	p.	p.	p.	...	p.	p.	220	00334	44200	
18501	M.	p.	p.	p.	...	p.	p.	50	12133	43100	
18503	M.	p.	p.	p.	...	p.	p.	28	15454	55310	
14556	F.	p.	p.	p.	...	p.	p.	14	35344	42100	
18522	M.	p.	p.	p.	...	p.	p.	70	55555	32100	
18492	M.	p.	p.	p.	...	p.	p.	18	55444	44310	
18514	M.	p.	p.	p.	...	p.	p.	224	12233	21000	Rare red ce
18524	M.	p.	p.	p.	...	p.	p.	62	10233	31000	
18529	M.	p.	p.	p.	...	p.	p.	86	55555	43100	
18539	M.	p.	p.	p.	...	p.	p.	126	11133	11000	2d "strong positive."
18562	M.	p.	p.	p.	...	p.	p.	35	55555	43000	Twice.
18586	M.	p.	p.	p.	...	p.	p.	34	45555	55410	
18591	F.	p.	p.	p.	...	p.	p.	70	55555	53130	Few red cells.
18587	M.	p.	p.	p.	...	p.	p.	40	55553	34310	Rare red cell.
18615	M.	p.	p.	p.	...	n.	p.	40	55555	55531	25 red cells.
18604	M.	p.	p.	p.	...	p.	p.	34	55555	55531	
18623	F.	p.	p.	p.	...	p.	p.	40	55555	54200	
18651	F.	p.	p.	p.	...	p.	p.	27	55555	55420	
18656	M.	p.	p.	p.	...	p.	p.	150	55555	55542	1,000 red cells.
18655	F.	d.d.	p.	p.	...	p.	p.	32	55555	54d00	d-0 to 1.
18661	M.	p.	p.	p.	...	p.	p.	7	55554	21000	
18605	M.	p.	p.	p.	...	p.	p.	227	44345	32100	

TABLE I—*Continued*

Case No.	Sex	Wass. R.		Alb.	Globulin			Cells	Gold		Remark
		Bl.	Fl.		Kap.	Nog.	R.-J.		12345	678,10	
18679	M.	p.	p.	p.	...	p.	p.	185	55555	55554	
18699	M.	n.	p.	p.	...	p.	p.	393	55555	55555	
18717	F.	d.	d.	p.	...	p.	p.	71	44433	33311	
18737	F.	p.	p.	p.	...	p.	p.	147	55555	55533	
18767	M.	p.	p.	p.	...	p.	p.	120	25434	00000	Blood.
18800	F.	p.	d.	...	...	...	...	...	55555	55542	Bloody.
18804	F.	p.	p.	p.	...	p.	p.	55	55555	55432	
18799	F.	p.	p.	p.	...	p.	p.	8	55555	54300	
18808	M.	p.	p.	p.	...	p.	p.	85	55555	53210	
18785	M.	p.	p.d.	p.	...	p.	p.	82	55555	43211	
18817	M.	p.	p.	p.	...	p.	p.	48	55555	55321	
18784	M.	n.	d.p.d.	...	...	p.	p.	109	55554	31100	
18866	M.	p.	p.	p.	...	p.	p.	45	55555	33200	
18846	F.	p.	p.	p.	...	p.	p.	3–4	55554	32000	
18949	M.	d.d.d.d.	d.d.	p.	...	p.	p.	52	55555	532d0	
18946	M.	d.	p.	p.	...	p.	p.	...	55555	5432d	
18987	M.	p.	p.	p.	...	p.	p.	93	55555	55210	
19048	M.	p.	p.	p.	...	p.	p.	30	45555	55432	8,000 red cells.
19021	M.	p.	p.	p.	...	p.	p.	37	55555	42d00	
19000	M.	p.	n.p.	p.	...	p.	p.	109	55555	43100	Few red cells.
19070	M.	p.	p.	p.	...	p.	p.	60	23354	31000	
19091	F.	p.	p.	p.	...	p.	p.	55	55555	55521	Numerous red cells.
19087	F.	p.	p.	p.	...	p.	p.	17	55555	33d00	Few red cells.
19075	M.	d.p.	n.	n.	...	p.	p.	25	54553	10000	
18223	M.	p.	p.	...	p.	...	p.	15	22222	20300	
18146	F.	p.	p.	...	p.	...	p.	37	22340	00000	
18527	M.	p.	p.	p.	...	p.	p.	20	00032	21000	
18115	M.	p.	p.	...	p.	...	...	80	00000	00000	
18861	M.	p.	p.	n.	...	p.	p.	14	5331d	00000	
19046	F.	p.	p.	d.	...	n.	n.	3–4	00011	d0000	Few red cells.
19004	M.	p.	p.	p.	...	p.	p.	78	55555	5542d	
18583	M.	p.	p.	p.	...	p.	p.	46	55555	54300	
18966	M.	n.p.	p.	p.	...	p.	p.	78	45555	32d00	
Three cases in which changes in gold were not set down on card.											
18417	M.	p.	p.	p.	p.	...	p.	59	"Weak Positive."		
15781	M.	p.	p.	p.	p.	...	p.	30	"Positive."		
18549	M.	p.	p.	p.	...	p.	p.	200	"Positive."		
Tabo-Paresis											
18453	M.	p.	p.	p.	...	...	p.	22	55544	41000	
18565	F.	p.	p.	p.	...	p.	p.	84	55555	55200	
18021	M.	p.	p.	p.	...	p.	p.	70	55555	32100	
18607	M.	p.	p.	p.	...	p.	p.	70	55555	55420	
18882	M.	d.n.	p.	p.	...	p.	p.	12	55555	55322	
19027	M.	p.p.	d.p.	p.	...	p.	p.	21	55555	53100	
18319	M.	d.d.	p.	p.	n.	...	p.	74	02254	33100	Good illustration of variation in reaction acc. to reagent.
									04445	44000	
									00031	00000	
18177	M.	d.	n.	...	p.	...	n.	8	44552	00000	
		d.	n.	...	p.	...	p.	11	35554	10000	
17859	M.	p.	d.	gold and W.R. only					33333	20000	
			Spinal, post mortem						45555	442dd	
			Base, post mortem						55555	54220	Slightly bloody.

TABLE I—*Continued*

Tabes

Case No.	Sex	Wass. R.		Alb.	Globulin			Cells	Gold		Remarks
		Bl.	Fl.		Kap.	Nog.	R.-J.		12345	678910	
16111	F.	n.	n.	p.	...	p.	p.	60	1333	10000	
Tabes or Spinal Syphilis											
18523	F.	p.	p.	p.	...	p.	p.	435	22244	32000	Rare red cell.
Paresis or Cerebral Syphilis											
18701	F.	p.	p.	p.	...	p.	p.	110	55533	32200	1,000 red cells.
19018	M.	p.	d.	p.	...	p.	p.	...	55555	5533d	6,000 red cells.
			n.	p.	...	p.	p.	204	55555	5532d	Few red cells.
Paresis Cases with More than One Test											
16277	M.	p.	p.	p.	n.	...	p.	9–			
								10	11233	10000	
									12221	00000	
18408	M.	p.	p.	n.	n.	...	n.	3–4	00001	10000	
									00112	11000	
18355	M.	p.	p.	p.	p.	...	p.	30	00033	33000	Previous to salvarsan intraspinously the gold was typical.
									00055	54000	
									00033	10000	
18349	M.	p.	p.	p.	p.	...	p.	30	44555	40450	Shows well the variation in reagents.
									04445	54400	
									00003	31000	
18111	F.	d.p.	p.	...	p.	...	p.	20	44443	33000	
		p.	p.	p.	...	p.	p.	...	00020	21000	Red cells. Treated.
18321	M.	p.	u.	n.	...	n.	n.	...	00002	02000	Few red cells.
			p.	p.	...	...	p.	25	00134	42100	
18502	M.	n.	n.	n.	...	n.	n.	12	00024	33000	
			n.	p.	...	p.	p.	3–5	00000	00000	
			n.	p.	...	n.	n.	1	00000	00000	
18674	M.	p.	p.	p.	...	p.	p.	59	01233	21000	
									00000	00000	
		Second fluid—gold only							00000	00000	
18224	M.	p.	d.	...	p.	...	...	75	50114	40000	Error in technique.
			p.	...	p.	...	p.	120	55555	52000	
18444	M.	d.	d.	p.	...	p.	p.	148	45555	52200	
			d.	p.	...	p.	p.	112	55534	44210	
			d.	p.	...	p.	p.	141	50250	40300	Red cells. Error.
18575	F.	p.	p.	p.	...	p.	p.	36	44444	00000	
			p.	p.	...	p.	p.	93	14432	10000	Remission.
17355	M.	p.	p.	p.	...	p.	p.	90	55543	21000	
			p.	p.	...	p.	p.	84	55555	53100	Remission.
18681	M.	p.p.	d.	p.	...	p.	p.	18	55555	55521	
			p.	p.	...	p.	p.	28	55555	55300	
18815	F.	p.	p.	p.	...	p.	p.	86	55554	32000	
			p.	p.	...	p.	p.	113	25454	42100	
18930	M.	d.p.d.p.	d.	p.	...	d.	p.	105	01333	21000	
			p.	p.	...	p.	p.	208	55222	10000	7,000 red cells.
19001	M.	n.p.	i.	p.	...	p.	p.	82	55004	02200	
			p.	p.	...	p.	p.	...	55555	5431d	Post mortem.
		Fluid from base, post mortem							55555	5532d	Slightly bloody.

TABLE I—*Continued*

Case No.	Sex	Wass. R. Bl.	Wass. R. Fl.	Globulin Alb.	Globulin Kap.	Globulin Nog.	Globulin R.-J.	Cells	Gold 12345	Gold 678910	Remark
19050	M.	p.p.	u.	p.	...	p.	p.	429	55555	5431d	
			n.	p.	...	p.	p.	200	55555	55553	Few red cells.
			p.	p.	...	p.	p.	220	01555	53d00	
18850	M.	n.p.	p.	p.	...	p.	p.	10	55555	30000	
			p.	p.	...	p.	p.	27	55555	53322	
18452	M.	p.	d.p.	p.	...	p.	p.	78	45555	32d00	
		Fluid from lumbar, post mortem							54535	44100	
		Fluid from base, post mortem							55535	53200	
18552	M.	p.	p.	p.	...	p.	p.	100	20002	22000	1,000 red cells.
		Fluid from lumbar, post mortem							55555	5522d	
Arteriosclerotic Insanity											
18212	M.	p.	n.	...	p.	...	p.	20	33333	00000	Many red cells.
18218	M.	p.	n.	...	n.	...	n.	0	00223	30000	
18377	M.	p.	n.	p.	...	...	n.	...	00000	00000	
17831	M.	n.	n.	p.	...	...	n.	...	00000	00000	Post mortem.
18267	M.	n.	n.	n.	n.	...	n.	...	00000	00000	2 bloody specimens.
18272	F.	p.	n.	...	n.	...	n.	4–5	00011	10000	Few red cells.
18252	M.	n.	n.	...	p.	...	p.	...	00000	00000	Blood. Post
14077	M.	n.	n.	...	n.	...	n.	...	00020	00000	mortem.
17453	M.	n.	n.	...	n.	...	n.	...	00000	00000	(2) post mortem.
18375	M.	n.	n.	...	n.	...	n.	0–1	00111	00000	
18608	F.	n.	n.	...	n.	...	n.	1	00010	00000	
18858	M.	n.	n.	n.	...	n.	n.	2–3	00022	21000	
18876	M.	n.	n.	n.	...	n.	n.	0–1	11000	00000	
18793	F.	n.	n.	p.	...	p.	p.	3–4	11233	32100	Few red cells.
Cases with Several Tests											
18104	M.	n.	n.	...	n.	...	...	8			
			n.	...	n.	...	...	7	11333	44411	Due to use of
			n.	n.	...	n.	n.	3–5	00010	00000	too delicate
			n.	...	...	...	n.	2–3	0dd10	00000	reagent.
18119	M.	p.	n.	...	p.	...	...	...	00000	00000	Red cells.
			n.	...	n.	...	...	97	32200	00023	
			n.	...	...	...	n.	27	02100	00000	
18646	F.	p.	d.	p.	...	p.	p.	4–5	d1123	455dd	Bloody.
		p.	d.	p.	...	p.	p.	3–4	11232	10000	Red cells.
		d.	d.	p.	...	n.	n.	4	ddd22	2dd00	
Alcoholics											
18229	M.	n.n.	n.	...	n.	...	n.	...	00333	20000	Numerous red
18456	M.	p.	n.	n.	...	n.	n.	3	00000	00000	cells.
18109	F.	d.	n.	...	p.	...	...	2	00000	00000	
18176	M.	d.	n.	...	n.	...	...	3	00200	00000	
18249	M.	n.	n.	...	n.	...	n.	3	00000	00000	
18226	M.	n.	n.	...	n.	...	n.	2	00000	00000	Post mortem.
18399	M.	n.	n.	n.	n.	...	n.	...	00000	00000	
18374	F.	p.	n.	n.	n.	...	n.	2	00122	21100	
13360	M.	n.	n.	n.	n.	...	n.	4	00121	11110	
18393	M.	d.d.	n.	n.	n.	...	n.	1	00000	00000	
18440	M.	n.	n.	n.	n.	...	n.	0	00001	10000	
18494	M.	n.	n.	n.	n.	...	n.	1	00001	00000	Few red cells.
18675	F.	n.	n.	n.	...	n.	n.	1	00120	00000	

TABLE I—*Continued*

Case No.	Sex	Wass. R. Bl.	Wass. R. Fl.	Alb.	Globulin Kap.	Globulin Neg.	Globulin R.-J.	Cells	Gold 12345	Gold 678910	Remarks
18721	M.	n.n.	n.	n.	...	n.	n.	4–5	00011	11000	
18319	M.	d.d.	p.	n.	...	n.	n.	3	22220	00000	
18781	F.	p.	n.	n.	...	n.	n.	3	00012	00000	
18754	M.	d.d.d.	u.n.u.	n.	...	n.	n.	2	00221	00000	
18868	M.	n.	n.	n.	...	n.	n.	1	00122	10000	
18855	M.	p.p.	n.	n.	...	n.	n.	2	00000	00000	
18874	M.	d.p.d.p.	n.	n.	...	n.	n.	1	00011	10000	
18827	M.	n.	n.	n.	...	n.	n.	3	00000	00000	
18926	F.	n.	n.	n.	...	n.	n.	2	00ddo	00000	
18915	M.	p.d.p.	n.	p.	...	p.	n.	15	00ddo	00000	
				p.	...	n.	d.	10	02222	d0000	
19044	M.	p.p.	n.	n.	...	n.	n.	...	0dd31	d0000	
				...	...	n.	n.	...	11110	00000	
17465	M.	n.	.....	...	...	p.	p.	...	30011	d0000	Post mortem.
									00000	00000	Error in technique.
18381	M.	n.	n.	n.	...	n.	n.	4	00000	00000	Alcoholic epilepsy.
						Manic Depressive					
18046	F.	d.d.	n.	...	n.	...	...	...	00000	00000	
18081	M.	d.	n.	...	n.	...	...	0	00000	00000	
18138	F.	d.d.	n.	...	n.	...	...	4	00000	00000	
18025	F.	d.	n.	...	d.	...	...	1	00000	00000	
18285	M.	n.	n.	...	n.	...	...	5	00000	00000	
18333	F.	n.	n.	p.	...	...	n.	...	00000	00000	Post mortem.
17803	F.	n.	n.	n.	...	n.	n.	30	00000	12100	Post mortem.
18136	F.	n.	n.	n.	...	n.	n.	0	00000	00000	
18394	F.	p.	n.	n.	...	n.	n.	3	00000	00000	40 red cells.
16295	F.	.....	n.	n.	...	n.	n.	0	01222	10000	
18373	F.	p.	n.n.	n.	...	n.	n.	5	00000	00000	
16793	F.	.....	n.	n.	...	n.	n.	1	00000	00000	
16356	M.	n.	d.	...	n.	...	...	6	01233	33220	
		.....	n.	n.	...	n.	n.	...	00000	00000	2 golds same.
						Dementia Præcox					
18103	F.	n.	n.	...	n.	...	...	3	00000	00000	
18091	M.	d.	n.	...	n.	...	...	9	00010	00000	
18090	M.	n.	n.	...	n.	...	...	3	00111	00000	Red cells.
18191	F.	d.d.n.	n.	...	n.	...	...	0	00000	00000	
12463	F.	.....	n.	p.	...	...	p.	...	00000	00000	Post mortem.
17562	M.	.....	n.	p.	...	...	p.	...	00000	00000	Red cells.
18415	M.	n.	n.	n.	...	n.	n.	0	00111	00000	
10169	F.	p.	n.	n.	...	n.	n.	0	00000	00000	
11065	F.	p.	n.	n.	...	n.	n.	3	00000	00000	
11108	F.	n.	n.	n.	...	n.	n.	...	00000	00000	2 golds same.
17178	F.	p.	n.	n.	...	n.	n.	0	00000	00000	
13937	M.	n.	n.	n.	...	n.	n.	3	00000	00000	
14610	F.	.....	n.	n.	...	n.	n.	3	01122	00000	
17671	M.	p.	n.	n.	...	n.	n.	...	00000	00000	Red cells.
16981	F.	n.	n.	n.	...	p.	n.	...	00000	00000	
18757	F.	n.	n.	n.	...	n.	n.	1	11110	00000	
18776	M.	p.p.	n.	n.	...	d.	d.	17	00000	00000	
18996	M.	p.	n.	n.	...	n.	n.	4	00000	00000	
13347	M.	n.	n.n.	p.	..	d.	...	2	12333	10000	

TABLE 1—*Continued*

Case No.	Sex	Wass. R. Bl.	Wass. R. Fl.	Alb.	Globulin Kap.	Globulin Nog.	Globulin R.-J.	Cells	Gold 12345	Gold 67890	Remarks
18499	M.	d.p.	p.	n.	...	n.	n.	72	01121	00000	Developing cerebral syphilis.
		.....	p.	...	...	n.	n.	57	22211	00000	
									13343	10000	
									12333	10000	
		.....	d.	n.	...	n.	n.	27	23211	00000	
		.....	.....	...	...	p.	p.	55	23333	20000	
18520	M.	p.d.	p.	n.	...	n.	n.	2	00000	00000	
		.....	n.	n.	...	n.	n.	...	00000	00000	
		.....	n.	n.	...	n.	n.	1	00011	11000	
18117	M.	d.	n.	...	n.	...	...	0	00000	00000	
18306	F.	p.p.	n.	n.	...	n.	n.	0	00011	00000	
18642	F.	p.	n.	...	...	...	...	...	33234	2d000	Bloody.
		.....	.....	n.	...	n.	n.	...	22220	00000	
					Defectives						
18269	M.	n.	n.	...	n.	...	...	...	00000	00000	Red cells.
14722	M.	p.	n.	n.	n.	...	n.	2	00001	10000	
18454	F.	n.	n.	n.	...	n.	n.	0	00000	00000	
18551	M.	n.	n.	n.	...	n.	n.	4	00012	11000	
18629	F.	n.	n.	n.	...	n.	n.	3	00000	00000	
18816	M.	n.	n.	n.	...	n.	n.	2	01110	00000	
19090	M.	n.	n.	...	...	...	...	...	00dd	11000	Post mortem.
					Epileptics						
18682	M.	n.	n.	n.	...	n.	n.	1	01232	11000	
15689	M.	n.	n.	...	n.	...	...	4	00000	00000	
18384	M.	n.	n.	n.	...	n.	n.	...	01111	00000	Red cells.
18992	F.	d.	n.	p.	...	p.	...	3	00121	dd000	Numerous red cells.
18928	F.	n.	n.	n.	...	n.	n.	0	00ddo	00000	Few red cells.
					Drugs						
18203	F.	p.	p.	...	n.	...	...	9	44441	00000	
18358	F.	p.	d.n.	n.	...	n.	n.	8	00000	00000	2 golds same.
18821	F.	p.p.	n.	...	...	...	...	3	11333	00000	Bloody.
19019	F.	p.	n.	n.	...	n.	n.	2	00ddo	00000	
18944	M.	p.p.p.	n.	p.	...	n.	n.	3	00000	00000	
					Unclassed						
15795	M.	.....	n.	...	n.	...	...	0	00000	00000	
18219	M.	n.	n.	...	n.	...	n.	4	00000	00000	
14043	M.	n.	n.	n.	...	n.	n.	2	00000	00000	(?)
18407	F.	n.	n.	n.	...	n.	p.	...	00ddo	00000	Red cells.
18469	M.	n.n.	n.	n.	...	n.	n.	2	00000	00000	
18705	F.	p.	n.	n.	...	n.	n.	6	11110	00000	
18829	F.	p.	n.	p.	...	p.	p.	1	00122	10000	Few red cells.
19078	M.	n.	n.	p.	...	n.	d.	4	00d11	d0000	
18820	F.	p.	n.	p.	...	p.	p.	2	11233	32000	Red cells.
		.....	n.	p.	...	n.	p.	6	00022	20000	

TABLE I—*Concluded*

Unclassed Organic Disease

Case No.	Sex	Wass. R.		Alb.	Globulin			Cells	Gold		Remarks
		Bl.	Fl.		Kap.	Nog.	R.-J.		12345	678910	
16456	M.	n.	n.	p.	p.	...	...	26	55555	55432	Paretic?
18386	F.	n.	n.	p.	...	p.	p.	27	32554	31000	Multiple sclerosis.
18030	F.	n.	n.	...	n.	...	n.	...	00000	00000	Post mortem.
18526	F.	n.n.	n.	d.	...	n.	n.	3	01110	00000	
18884	M.	n.	n.	n.	...	n.	n.	1	00012	00000	
17342	F.	n.	n.	p.	...	n.	n.	6	dd122	1d000	
15027	F.	n.	n.	n.	...	n.	n.	13	00000	00000	2 golds same. Few red cells.
18047	F.	n.	n.	...	n.	...	n.	5	02100	00000	

Miscellaneous

18457	M.	n.	n.	...	...	...	...	...	01111	22100	Bloody. Acromegaly.
19053	F.	n.	n.	n.	...	n.	n.	0	00122	2d000	Few reds. S.D.
18038	M.	n.	n.	...	p.	...	...	2	00133	21000	Infection-exhaustion.
18266	M.	d.	n.	...	n.	...	n.	3	00000	00000	Pernicious anemia.
18791	M.	p.	n.		Bloody				44532	20000	Trauma.
18199	M.	d.	n.	...	n.	...	n.	7	00020	00000	Trauma.

RESULTS OF TESTS

All of the data are presented in Table I, where the cases are grouped according to the clinical diagnoses. There are altogether 240 cases, of which number 120 fall into the general group of brain syphilis. Of these, 9 are cases of tabo-paresis; 1 a case of tabes; 3 are cases in which diagnosis between paresis, tabes or cerebrospinal syphilis is uncertain; the remaining 107 are cases of paresis.

In this section the tests are dealt with individually.

1. *The Wassermann Test.*—Tables II and III are constructed from the data given in Table I. Table II gives a general survey of the blood and spinal fluid findings in the various groups. In Table III these are further analyzed, the fluid findings being arranged according to the blood findings in each group.

In a previous paper (15) I have presented the statistics from a series of 1,600 patients admitted to this hospital on whom the Wassermann reaction was used as a routine. In the group of 145 paretics there considered, the blood test was positive in 87.5 per cent. and negative in 10.3 per cent. The spinal fluid was positive in

87.2 per cent. of 111 cases tested and negative in 8.5 per cent. The test was positive in both fluids in 75 per cent. of cases. Data were presented on 145 paretics.

In the group of 120 here reported (in part the same as the above) the blood Wassermann reaction is positive in 81.8 per cent.; negative in 6.0 per cent. (116 cases with blood test); the fluid Wassermann reaction is positive in 90.0 per cent. and negative in 4.1 per cent. (120 cases of fluid test), while the test is positive in both in 77.5 per cent. (116 cases with tests in both). These figures are based on the number of cases with tests in each fluid. There is a somewhat higher percentage of doubtful results in the group here reported.

TABLE II

RESULTS OF THE WASSERMANN TEST ON BLOOD AND FLUID

Psychosis	No. Cases	Blood Wassermann				Fluid Wassermann			
		Pos.	Dbtfl.	Neg.	None	Pos.	Dbtfl.	Neg.	None
Neuro-syphilis	120	96[3]	13	7	4	108[1]	7	5	1
Arteriosclerosis	17	6	.....	11	.....	.....	1	16	....
Alcoholic	26	7	5	14	.....	1	.....	24	.....
Manic depressive	13	2	4	5	2	.....	1	12	.....
Dementia præcox	24	9	3	9	3	.....	1[4]	23[2]	.....
Defectives	7	1	.....	6	.....	.....	.....	7	.....
Unclassed	9	3	.....	5	1	.....	.....	9	.....
Unclassed organic	8	.....	.....	8	.....	.....	.....	8	.....
Drugs	5	5	.....	.....	.....	1	1	3	.....
Epilepsy	5	.....	1	4	.....	.....	.....	5	.....
Miscellaneous	6	1	2	3	.....	.....	.....	6	.....
Totals	240	130	28	72	10	110	11	118	1

This table includes all cases, those tested post mortem as well as ante mortem.

There are only 2 cases in this group in which both blood and fluid are negative to the Wassermann reaction.

2. *Cell Counts.*—Among the cases of brain syphilis counts of 3–4 per cu. mm. have occurred in 4 cases. The next lowest count is 6, and the highest is 435.

In 127 counts on the fluids from the 120 cases of brain syphilis, counts of 10 or below occurred in 13 cases: 11–25 in 20; 26–50 in 26; 51–100 in 38; 101–250 in 27; over 250 in 3. In other words, 97 gave counts of less than 100, and 30 counts over 100.

[1] One case cholesterin reinforced antigen only.
[2] One case once positive; 3 times negative.
[3] Including 4 cases with negative and positive tests.
[4] Twice positive; once doubtful.

Table III

Further Analysis of Combination of Tests in Blood and Fluid

Blood Wassermann Reaction Positive	No. Cases	Fluid Wassermann Reaction +	±	−	o
Neuro-syphilis	96	90	4	2	.....
Arteriosclerosis	6	.....	1	5	.....
Alcoholic	7	.....	.....	7	.....
Manic depressive	2	.....	.....	2	.....
Dementia præcox	9	.....	1	8	.....
Defectives	1	.....	.....	1	.....
Unclassed	3	.....	.....	3	.....
Drugs	5	1	1	3	.....
Miscellaneous	1	.....	.....	1	.....
Blood Wassermann Reaction Doubtful					
Neuro-syphilis	13	9	3	1	.....
Alcohol	5	1	.....	4	.....
Manic depressive	4	.....	.....	4	.....
Dementia præcox	3	.....	.....	3	.....
Epilepsy	1	.....	.....	1	.....
Miscellaneous	2	.....	.....	2	.....
Blood Wassermann Reaction Negative					
Neuro-syphilis	7	5	.....	2	.....
Arteriosclerosis	11	.....	.....	11	.....
Alcoholic	14	.....	.....	13	1
Manic depressive	5	.....	1	4	.....
Dementia præcox	9	.....	.....	9[5]	.....
Defectives	6	.....	.....	6	.....
Unclassed	5	.....	.....	5	.....
Unclassed organic	8	.....	.....	8	.....
Epilepsy	4	.....	.....	4	.....
Miscellaneous	3	.....	.....	3	.....
No Blood Wassermann Reaction					
Neuro-syphilis	4	4[6]	.....	.....	.....
Manic depressive	2	.....	.....	2	.....
Unclassed	1	.....	.....	1	.....
Dementia præcox	3	.....	.....	3	.....

It has been known for some time that the cell count is not necessarily of diagnostic or prognostic value. Thus the old dictum that counts over 100 cells were indicative of cerebrospinal lues as distinguished from paresis and tabes has been abandoned. Mitchell, Darling and Newcomb (16) and latterly Solomon (27) have shown how the cell count may vary in both untreated and treated cases of paresis. The former found very wide variations in the count from time to time, from 260 at one time to 0 at another in the same untreated case. In 31 of 34 cases they found counts less than 3 at some time.

[5] 1 case + once, 3 times.
[6] 1 case reinforced antigen only.

Solomon concludes that the number of cells offers no definite information of prognostic value and that one cannot differentiate cerebrospinal syphilis or general paresis on the basis of the cell count. Further, he states that the cell count is not an index of the predominance of irritative or degenerative changes.

Counts above 5 per c.mm. occurred in this series in the following cases other than cerebrospinal syphilis: 3 arteriosclerotics; 1 alcoholic; 1 manic-depressive case (post mortem); 3 unclassed organic and 1 traumatic. Nearly all of these cases had positive blood Wassermann tests.

In the majority of my cases, no special attempt has been made to do accurate differential counts. This is to be regretted.

Cotton and Ayer (2) and many others have shown the value of the differential count, and especial stress is laid on the plasma cell. Plasma cells were not found in any non-luetic psychosis, but were noted (not carefully searched for) in about one half of the syphilis group.

3. *Globulin Tests.*—*A.* Kaplan Test. In 36 tests on 34 cases of the syphilitic group, the test was negative in 4. In the other 32 tests on 30 cases it was positive in some dilution. On fluids from non-specific cases it was positive in 5 or 47 tests. Of these 5, two may be ruled out because of blood in the fluid, leaving 3 tests in 45 positive. Three times blood was demonstrated microscopically and the test was negative.

B. Noguchi Test. A positive result was obtained in 74 out of 80 syphilitic cases tested. In 13 of these the test was twice positive. In 4 cases the test was negative; in 1 doubtful and positive and in 1 negative, positive and again negative at different examinations. In 5 cases the result may have been influenced by the blood present.

Used 86 times on 70 fluids from non-syphilitic cases, the test was negative in 56 cases (in 2 were traces of blood). In 6 it was positive (3 bloody fluids: one post mortem): in 2 it was doubtful. The repeated tests were: (1) 2 bloody fluids positive, a third negative; (2) 3 negative, 1 positive (cerebral syphilis developing); (3) 3 negative; (4) 2 negative; (5) and (6) bloody positive and negative.

It seems evident that, with a blood free fluid, the test is very reliable, and that doubtful tests are very rarely obtained.

C. Ross-Jones Test. Used in 106 syphilitic cases, it was positive in 101 (90 on one test; 9 on two; 2 on three tests). In 2 it was negative. In 2 it was first negative, then positive, while in 1 it was

negative, positive and again negative. In 10 cases the positive result may have been influenced by the blood present.

Used in 86 cases not diagnosed as neurosyphilis it was positive in 9 (of which 6 were bloody and 2 were obtained post mortem); negative in 75 (4 with blood; 2 twice and 2 thrice negative; 1 twice positive (bloody) and once negative; 1 doubtful and negative; 1 thrice negative and once positive); and doubtful in 2.

If we rule out the cases examined post mortem and those with bloody fluids, we find only 1 case with positive test. The test is, therefore, very reliable.

4. *Albumen Test.*—This test was used in 94 cases of neurosyphilis with the following results: positive in 86 (blood present in 6; thrice positive in 2; twice positive in 6; bloody fluid positive, and later positive without blood in 2); negative and positive in 2; negative in 4; doubtful in 2.

No definite conclusions can be drawn from the amount of excess. In general, the positive cases showed about double the normal amount.

The test was used on 84 non-syphilitic cases, with a positive result in 16, doubtful in 1, and negative in the others. In general, the excess was slight and occurred, as a rule, in those cases with some organic lesion.

This result bears out Myerson's contention that albumen increase is an undifferentiated response to injury.

5. *The Gold Test.*—As stated above, a test is regarded as in some sense positive when 3 or more tubes show a color change to "3" or more. The syphilitic zone is the first five tubes. The tests are here analyzed both according to clinical groups and intensity of reaction.

A. Paresis—single tests: 84 cases. Type reaction: 5–5–5–5–5–4–3–1–0–0.

Analysis of the data in Table I shows the following:

First 5 tubes decolorized — "5"	41 cases
First 5 tubes change to "4" and "5"	11 cases
First 5 tubes change to "3," "4" and "5"	7 cases
	59

i. e., 59 of the 84 cases show changes of a positive order in all of the first 5 tubes.

For the entire group, the changes in each tube may be summarized as follows:

Tube No.	Color Change						
	5	4	3	2	1	0	d
1.....	51	9	3	5	8	8	0
2.....	57	5	6	5	4	7	0
3.....	55	7	11	5	2	4	0
4.....	58	8	13	2	2	1	0
5.....	49	14	13	3	2	2	1
6.....	38	13	19	6	3	4	1
7.....	26	2	15	11	9	11	0
8.....	10	9	14	13	10	24	4
9.....	2	4	6	7	13	51	1
10.....	1	2	1	5	7	66	2

Further analysis of Table I shows that in 10 of these 84 cases, the reaction was decidedly atypical. These, with reaction, were:

18140	00045	55400
15589	00234	32100
16454	01233 +	+ 32200
18463	— 334	44200
18501	12133	43100
18524	10233 +	31000
18527	00032	21000
18115	00000	00000
19046	00011	± 0000
18223	22222	20300

In all of these there were other evidences of abnormality in the fluid to corroborate the diagnosis.

Removing the 59 and 10 cases, we have remaining 15 cases which gave neither absolutely typical nor decidedly atypical reactions.

Therefore it seems that in about 10 per cent. of our cases with a single test, an atypical reaction is obtained. Probably most of these, on further testing, would have given a positive reaction.

B. Tabo-paresis—6 cases. All gave a strongly positive test, typical for paresis.

C. Other neurosyphilis cases (tabes 1; tabes or spinal syphilis 1; paresis or cerebral syphilis 1). These were all positive in the syphilitic zone, though of varying intensity.

D. Paresis cases with more than 1 test. The majority of these cases were tested ante mortem only. Four of these gave essentially negative results. One of these showed a slight reaction in the syphilitic zone, while the other 3 showed slight reactions in one test, but none in others. The remaining 17 all gave positive reactions on one or more tests.

No. 18355 illustrates one point remarkably well. This man had

received intensive salvarsan treatment without clinical improvement. Previous to the treatment the gold had been typical, but in this table a great change had been affected.

No. 18349 gives a very good illustration of variation in results according to reagent. All 3 tests were made the same day on the same sample of fluid with 3 different batches of reagent, varying from normal to a clear, very dark red.

Three cases were tested both ante mortem and post mortem, with essentially the same results except in 1, where a much more intense reaction was secured post mortem.

E. Other neurosyphilis cases with repeated tests. Case No. 18319 further emphasizes the varying results with different reagents. Case No. 17859 is of interest because of the much more intense reaction obtained from the cerebral fluid, as compared with the spinal.

F. Non-syphilitic cases. Four of these cases appear to have a syphilitic basis. These are 18499 (diagnosis dementia præcox), an hallucinated, fearful case with high cell count and a weak gold reaction in the syphilitic zone; 16456, a case of 11 years' duration, clinically paresis with spastic paraplegia, with a positive gold but negative Wassermann; and 18386, a case of multiple sclerosis, with negative Wassermann, positive gold (no response to anti-syphilitic treatment); 18203, a drug habitue with serological findings of paresis.

Aside from these, no positive reactions are found (according to our criteria), except in certain bloody fluids, or where there has been previous hemorrhage. A certain number of cases show minor grades of change, at times in the syphilitic zone. In many of these cases we are certain that the reagent is at fault; in others, the reason is obscure.

None of these cases gives a reaction at all comparable to the typical paretic curve, though some of our paretic cases give results somewhat comparable to the non-paretic results.

Discussion

The results of the Wassermann test, the proteid tests and the cytological results have been sufficiently discussed above. There remains only the gold reaction.

The finding of certain slight color changes in a few tubes in non-syphilitic cases, is in accord with the general experience. In fact, Flesch (4) states that if *no* change is the criterion of the normal fluid, then the fluid is normal in only about 50 per cent. of

normal individuals. As previously pointed out, and substantiated by certain observations, we believe that in a certain proportion of cases this is due to slight defects in the reagent.

With regard to the syphilitic cases, results of various observers differ somewhat. Thus Solomon and Koefod (23) show that paresis gives very typical reactions, but a case of undoubted paresis may give atypical reactions, and cases not paresis may give the type reaction. (Here, again, there is the possibility of minor grades of reagent variation.) Solomon, Koefod and Wells (26) reporting on 500 cases, believe the test is of value in the differentiation of paresis, cerebrospinal syphilis and tabes; that syphilitic cases do not react out of the syphilitic zone, though non-syphilitic cases may react within the zone.

Jaeger and Goldstein (8) state that, in paresis and cerebrospinal syphilis, they obtain a strong characteristic precipitation in 100 per cent. of cases.

Kaplan (9, 10, 11) finds a characteristic curve for all cases of paresis and some of tabo-paresis, but does not think the test is specific for neurosyphilis.

Weston, Darling and Newcomb (29) find the test positive in all cases of paresis.

I find about 10 per cent. of decidedly atypical results, and about 10 per cent. of intermediate, with 80 per cent. fairly typical, in cases of paresis and tabo-paresis. To be sure, there are one or two of our cases diagnosed paresis in which there might be considerable doubt of the diagnosis, but these do not greatly affect the percentages. It is certain that, with Danvers criteria of diagnosis, the reaction is not typical for paresis in more than 90 per cent. of our paretic cases, although some sort of reaction in the syphilitic zone is found in a rather higher percentage. We have had no strong reactions in this zone without other evidence of abnormality in the spinal fluid.

In our experience, not only the gold sol (see Solomon and Welles (24)) but also the Wassermann reaction are entirely reliable post mortem. We do find, however, regular evidence of increase of albumen in these post-mortem fluids, which seems to be without diagnostic significance.

As a general rule, in both syphilitic and non-syphilitic cases, the gold reaction and the Wassermann reaction are closely parallel. Exceptional cases will give one reaction negative and the other positive. These may usually be cleared up by repeated tests. However, it may safely be stated that a positive, typical gold reaction is

of almost as much value alone as supported by a Wassermann test. This in view of our experience that in only 2 cases was a negative Wassermann obtained where the gold was strongly positive, and in both of these the other tests corroborated the gold results.

In fact, as a general statement, it is very easy to show a fairly close parallelism between protein excess, pleocytosis, gold and Wassermann reaction, although one or more of these may be negative in a given fluid, without seriously altering the interpretation. It is extremely unsafe to draw conclusions from fluids in which a single test is positive, and all others negative. In such cases a second test should always be done. Especially is it unsafe to diagnose neurosyphilis on the basis of a positive Wassermann in the spinal fluid, all the other tests being negative.

It is as yet uncertain which test first becomes positive in the development of neurosyphilis. Probably this varies. But until more is known, it is unsafe to base a diagnosis on a partial examination of the fluid. I have elsewhere reported (this series) a case in which an erroneous diagnosis was made on insufficient evidence of this sort.

A positive gold with all other tests negative has not occurred in my series. If it did occur, I should attach considerable weight to it, but in my opinion, no single test in the spinal fluid is enough to establish the etiology of an organic brain disease. The Wassermann test, protein tests, cell count and gold-sol test should all be done on every fluid which is examined. It is the sum of the results of these tests, which should decide.

Summary

1. Data are presented covering the spinal fluid tests on the cerebrospinal fluids from 240 cases of mental disease, of which 120 were diagnosed as neurosyphilis.

2. Various methods of performing each test, protein excess, cell count and gold reaction are described, together with a statement of methods now in use.

3. Of 130 positive blood Wassermann tests, 96 occurred in cases of neurosyphilis. The test was negative in 7 of 120 cases of neurosyphilis.

4. Of 110 positive fluid Wassermann tests, 108 occurred in cases of neurosyphilis. Five of 120 neurosyphilis cases gave negative tests. One alcoholic case and one drug case gave positive tests in the fluid. Both of these will probably develop paresis.

5. Ninety cases, or 75 per cent. of neurosyphilis gave positive

tests in both fluid and blood. One drug case gave positive tests in both.

6. In 127 counts on the fluids from 120 cases of neurosyphilis, counts below 10 occurred 13 times; 11 to 50, 6 times; 51 to 100, 38 times; above 100 in 30.

7. Counts above 5 per cu. mm. occurred in 3 arteriosclerotics, 1 alcoholic, 1 manic depressive (post mortem), 3 unclassed organic and 1 traumatic.

8. Excluding bloody fluids, and possibly fluids with old hemorrhages, the globulin tests (Noguchi and Ross-Jones) are (*a*) positive in practically all syphilitic and (*b*) negative in practically all non-syphilitic cases.

9. The occurrence of slight excesses of albumen in non-syphilitic organic cases apparently bears out Myerson's contention that the albumen increase is an undifferentiated response.

10. Typically positive gold tests were found in 80 + per cent. of paresis and tabo-paresis cases.

11. Atypical positive gold tests were found in 10 per cent. of cases; with decidedly atypical tests in the remaining 10 per cent. cases.

12. "Positive" gold tests were not found in cases without syphilis, except in old hemorrhage cases.

13. There is close parallelism in the results of all tests considered together.

14. Variations in gold reaction may be due to minor variations in the character of the reagent. These must always be considered.

15. Done under proper conditions and correctly interpreted, the gold reaction is of immense value.

16. It is the sum of the results of all reactions, and not the result of one, which is of value in diagnosis.

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Society Proceedings

AMERICAN NEUROLOGICAL ASSOCIATION

Forty-third Annual Meeting, May 21, 22 and 23, 1917, held in Boston, Mass.

The President, Dr. E. W. Taylor, in the Chair

Dr. E. W. Taylor read the presidential address (published in the July, 1917, issue of this Journal).

THE EFFERENT PALLIDAL SYSTEM OF THE CORPUS STRIATUM. A CONSIDERATION OF ITS FUNCTIONS AND SYMPTOMATOLOGY

By J. Ramsay Hunt, M.D., of New York

Certain systems of neurones underlying the function of motility are well known, *e. g.*, those of the pyramidal tracts and the peripheral motor nerves, the so-called central and peripheral motor neurones. Others are still shrouded in mystery and especially is this true of the extra-pyramidal motor tracts and their higher correlating mechanism.

The present contribution represents an effort to identify the controlling mechanism of the extra-pyramidal motor system, which Dr. Hunt believes is localized in the motor cells of the corpus striatum and which he would distinguish as the efferent *pallidal system.*

These conclusions are based upon the pathological changes in the corpus striatum in paralysis agitans, Huntington's chorea, progressive lenticular degeneration, double athetosis, and especially in the juvenile type of paralysis agitans which Dr. Hunt regards as a primary system disease of the corpus striatum, viz., a *primary atrophy of the pallidal system.*

The pyramidal tract system is the efferent motor system which unites the cerebral cortex with the spinal cord and regulates isolated synergic movements.

The pallidal system, on the other hand, Dr. Hunt regards as the essential efferent motor system of the corpus striatum and through its connection with important ganglia in the hypothalamic region, viz., the nucleus ruber, the corpus Luysii and the substantia nigra, exercises a controlling influence upon the extra-pyramidal motor tracts, thereby regulating the activities of automatic and associated movement. The one is a cortico-spinal system for the regulation of finer, discriminative movements, the other is a trio-spinal system for the control of inferior types of movement of more automatic and involuntary nature.

Anatomical.—The corpus striatum in man is composed of two ganglionic structures, the caudate nucleus and the lenticular nucleus, which are separated by the passage of the internal capsule. The lenticular nucleus is subdivided into an external segment, the *putamen*, and an internal segment—the *globus*

pallidus. The putamen and the caudate nucleus have the same origin and histological characteristics and together constitute the so-called *neostriatum* of comparative anatomy. This structure makes its first appearance in reptiles and increases in size and importance in birds and mammals.

The globus pallidus is an older structure phylogenetically and appears low in the scale of fishes. This is the *paleostriatum* of comparative anatomy, and in its more primitive form is termed the *nucleus basalis.*

This ganglionic mechanism is a higher regulating center for the motor activities of the lower forms of life and with the basal forebrain bundle of Edinger, the posterior longitudinal bundle and the primary motor fasciculus of the spinal cord constitutes the primitive motor mechanism of the central nervous system.

In man, these tracts are represented by the strio-hypothalamic radiations and the extra-pyramidal motor system (viz., the rubro-spinal and other descending motor tracts). The efferent neurones of the strio-hypothalamic radiations terminate in relation to important ganglionic structures in the hypothalamic region and mid-brain,—viz., the nucleus ruber, the corpus subthalamicum and the substantia nigra, and through them regulate the functions of the extra-pyramidal motor system.

The corpus striatum has no direct connection with the cerebral cortex or the internal capsule; it, however, stands in close relation with the optic thalamus by means of the striothalamic and hypothalamic radiations and through this great sensory correlating station with the sensory tracts of the spinal cord,—the cerebellum and the cerebral cortex. The pyramidal tract fibers as they pass through the internal capsule also send numerous collaterals to the corpus striatum.

The corpus striatum is composed of two cell types or rather two cellular systems,—a large cell projection system which is motor and which may be termed the *pallidal system,* and a small cell system with short axis cylinders which is inhibitory and coördinating in function. This small cell type is found in the caudate nucleus and putamen (neostriatum) and may be termed the *neostriatal* system.

The pallidal system originates in the large cells of the globus pallidus proper and in the large cells of the globus pallidus type which are scattered through the caudate nucleus and putamen. The large motor cells of the neostriatum are of unusual size and may be distinguished from the motor cells of the paleostriatum as the giant cells of the corpus striatum or *neopallidal* cells.

The large cells of globus pallidus type, both of the paleostriatum and the neostriatum, are of the motor type, and belong to the Golgi Type I, with a long axis cylinder process, neurofibrillæ and Nissl granules.

The small cells of the neostriatal system belong to the Golgi Type II, and have a short axis cylinder process, which breaks up into numerous subdivisions and terminates in the external and internal segments of the globus pallidus. This is essentially a short striatal association system.

In the human embryo the pallidal system receives its myelin sheath very early in fetal life, and the striohypothalamic radiations of the Ansa system are a conspicuous feature in Weigert preparations as early as the fifth month. The myelinization of the neostriatal system takes place at a later period, which is in harmony with the phyletic development of these two systems.

Physiological.—The corpus striatum presents evidences of cell degeneration in both Huntington's chorea and in paralysis agitans. In Huntington's chorea there is degeneration of the small cell system of the neostriatum, and in paralysis agitans of the large motor cells of the pallidal system. Dr. Hunt would therefore regard chorea and paralysis agitans as resulting from the destruction of one or other of these two systems, *neostriatal* or *pallidal.*

The neostriatal system is inhibitory and coordinating; the pallidal system is motor, controlling automatic and associated movements.

Paralysis agitans, according to this conception, would represent one of the fundamental types of central palsy. It is a paralysis of striospinal origin, and is characterized by *paralysis* of automatic and associated movements, rhythmical *tremor*, and *rigidity*, and may be contrasted with the spastic paralysis of cortico-spinal origin, which is characterized by *paralysis* of isolated synergic movements, *spasticity* and *exaggeration of reflex activities* (tendon reflexes and clonus).

Both of these systems, pyramidal and pallidal, are necessary for the proper functions of motility. In later fetal life the corpus striatum and the extra-pyramidal system probably play an important rôle in the production of fetal movements, which are active long before the development of the pyramidal system. The physiological choreiform movements of infants may likewise be referred to an undeveloped state of the inhibitory function of the neostriatal system.

The muscular rigidity of spastic paralysis and paralysis agitans presents certain fundamental differences, although the essential element, hypertonia, is present in both.

Recent investigations have shown that muscle tonus has two components —the quick contraction or twitch due to the activity of the anisotropic disc system and a slow plastic contraction due to the contraction of the sarcoplasmatic substance of muscle. The anisotropic disc system is under the control of the motor cell of the anterior horn, myelinated nerve fiber and motor end plate. The sarcoplasmatic substance, on the other hand, is under the control of a sympathetic motor cell in the anterior horn, a sympathetic nerve fiber and end plate. A striated muscle fiber has therefore a dual innervation, viz., the medullated nerve fiber for the disc system and the sympathetic nerve fiber for the sarcoplasm.

The difference in spasticity following a pyramidal tract lesion and the rigidity following disease of the pallidal system may be ascribed to the different degrees of involvement of these two muscle systems. The sarcoplasm of muscle and the anisotropic system while united in a striated muscle fiber have a totally different system of innervation and phylogenetically represent different stages of development. It is probable that they have also separate higher correlating centers for their control.

Both of these hypothetical higher correlating centers would be under the still higher control of the motor mechanism of the corpus striatum and when this control was lost an over-activity would result with a tendency to spasm (sarcoplasmatic substance) or tremor (disc system) as the case might be.

In the plastic rigidity of paralysis agitans, spasm of the sarcoplasmatic substance predominates, whereas the tremor is probably dependent upon the activity of the anisotropic disc system.

The pallidal system by its action upon these hypothetical correlating centers exercises an important influence on the sarcoplasmatic substance and the disc system of the striated musculature. In this manner the purely *rigid type* and the pure *tremor type* of paralysis agitans may be explained.

Symptomatology.—The *pallidal system* as the efferent motor system of the corpus striatum plays an important rôle in symptomatology. It may undergo atrophy—the *primary atrophy of the pallidal system*, producing the clinical picture of juvenile paralysis agitans, with paralysis of automatic and associated movements, rigidity and tremor; or it may be involved in senile or vascular degeneration, as in the presenile and senile types of paralysis agitans.

The small inhibitory and coördinating cells of the neostriatal system undergo degeneration in Huntington's chorea, releasing the pallidal mech-

anism from control with the development of choreiform manifestations. Chorea as encountered in Huntington's chorea may therefore be referred to a loss of the small, inhibitory and coördinating cells of the corpus striatum. Senile chorea may be referred to senile and vascular changes of the neostriatal system.

When both the pallidal and neostriatal systems are affected there is produced a combination of chorea and rigidity—viz., athetosis. This may occur as a distinct affection as the Athetôse Doublée associated with the so-called État Marbrè of the caudate nucleus and putamen; or as a symptomatic manifestation with tumor, hemorrhage, and other types of focal lesions.

In senile states, small areas of lacunar degeneration may develop in the corpus striatum, and involve the pallidal system. As a result there is a paralytic rigidity of gait, posture and articulation which may resemble more or less closely that of paralysis agitans. Distinct dysarthria or anarthria may follow lesions of the pallidal system.

Paralysis of expression, the so-called Parkinsonian mask, is one of the classical symptoms of paralysis agitans.

A lesion in the (forward?) part of the corpus striatum involving the pallidal system destined for the innervation of the face may, Dr. Hunt thinks, produce a paralysis of the emotional innervation of the face. Furthermore, it is possible that the center for the emotional innervation of the face is not situated in the anterior portion of the optic thalamus as was held by Nothnagel, but rather in the forward portion of the corpus striatum.

A *pallidal hemiplegia,* as in the unilateral paralysis agitans, is characterized by paralysis of certain automatic and associated movements, especially apparent in the act of walking. Among these are the combined flexion of hip, knee and foot, as in the normal step, the alternate rhythmical swinging movements of the arms, abduction of the thumb on opening the hand, and the associated extensor movement of the wrist on closure of the hand. These are lost or show considerable disturbance in typical paralysis agitans. There is also rigidity, without exaggeration of tendon reflexes, and the plantar reflex is normal.

Pyramidal hemiplegia, on the other hand, is characterized by paralysis, and a spastic state associated with clonus, exaggeration of the tendon reflexes and the Babinski phenomenon. Therefore, larger lesions in the region of the basal ganglia involving both the pyramidal and the pallidal motor systems would produce a form of hemiplegia which is neither pyramidal nor pallidal in the strict sense of the term, but combining the symptoms of each, viz., the *pallido-pyramidal type of hemiplegia.*

Dr. Chas. K. Mills, of Philadelphia, said the members of the association would remember that two or three years ago at the Albany meeting he had presented a paper on "Muscle Tonicity, Emotional Expression, and the Cerebral Tonectic Apparatus," and later another entitled "Some Clinical Studies of the Problems of Cerebral Tone" at the meeting of the American Medical Association's Section on Nervous and Mental Disease. This presentation by Dr. Hunt is, of course, of much interest and value. He seemed, however, to the speaker, to have not considered his subject enough along the lines of the admirable presidential address of Dr. Taylor just heard; in other words, he had not generalized sufficiently on the data presented. It is necessary that we should generalize, to the extent of determining the presence, or probable presence, of some form of controlling apparatus which is quite independent, or largely independent of the motor pyramidal system.

The speaker's own theory, which had been expressed before this association, is that there is an independent tonectic apparatus, directly and somewhat elaborately connected with the pyramidal motor system. The phenomena to which Dr. Hunt had just called attention, namely, those of paralysis agitans,

of Wilson's disease, and of tremors of various types, and perhaps even, going further, of catatonia, in the psychic field, all are concerned with questions that can only be explained in accordance with a theory which will bring before us some apparatus quite independent of, although working with, the pyramidal system.

With regard to the striatum, Dr. Mills had attempted to bring before this association his own conception, not altogether removed from that which Dr. Hunt had just presented, that it was a center or a combination of centers (these expressions are crude, anyhow) in which are associated the tonectic impulses which are differentiated in an extrapyramidal cortex, and that they are associated here for the purpose of delivery to a synergic apparatus. One difficulty which Dr. Mills and others who, like Crocq, had written upon this subject, had encountered in other authors, was in their confining themselves too closely to the pyramidal system in their attempt at explanations.

Dr. Southard said that Dr. E. W. Taylor in his presidential address had extolled the virtues of generalization. Dr. Southard wondered whether many of the phenomena to which Dr. Ramsay Hunt had called attention were not really particular instances of the operation of a principle which Dr. Southard would like to term the principle of "hyperkinesis by defect." Even the tonectic disorders to which Dr. Mills had a moment ago alluded were perhaps also largely instances of hyperkinesis by defect.

We are ordinarily inclined to ascribe positive or irritative lesions to the operation of some positive, irritative factor, as for example, convulsions brought about by the exhibition of strychnin. In point of fact, there were innumerable instances, of which Dr. Ramsay Hunt's rigidity and spasticity in paralysis agitans were beautiful examples, of the operation of this principle of hyperkinesis by defect. Dr. Southard had years ago tried to show a cellular basis for the mechanism of the attacks in organic epilepsy, pointing out the loss of the small cells and the maintenance of the large cells of the motor cortex therein. In fact such contentions have gone back to Bevan Lewis or even earlier. Recently Dr. Southard had tried to show that the hyperkinetic symptoms of many forms of mental disease were in some cases due to the simplification of the neuronic systems of the optic thalamus. It was possible that catatonic effects in the psychiatric sphere should be similarly explained, that is, by the loss of cells in certain parts of the nervous system. The phenomena of excess knee jerk in spinal cord disease form perhaps the simplest instance of hyperkinesis by defect. At the other end of the series stood such matters as impulsive acts and even the phenomena of hypersexuality (many of which could now be regarded as a result of infantilism) were perhaps also instances of hyperkinesis by defect.

Dr. Ramsay Hunt said in closing that his remarks on the dual motor innervation of the striated muscle fiber were based on a number of contributions from various sources during the last few years, notably those of Langelaan and Sherrington. The existence of a spinal innervation of the disc system (medullated nerve) and a sympathetic motor innervation of the sarcoplasm (sympathetic nerve) was shown by histological, chemical and experimental methods, and there could be no doubt but that this conception would play an important rôle in our understanding of muscle tonus and its allied phenomena.

As regards the development of the pyramidal tracts, it was shown by van Gehuchten that the axis cylinders of the pyramidal tracts in a fetus at the seventh month had not progressed beyond the pyramids of the medulla oblongata. Now an infant born at the seventh month presents a great variety of motor activities and yet van Gehuchten's investigations have proven that such an infant has no pyramidal tracts *functioning in the spinal cord.*

Dr. Hunt's suggestion was that movements of the fetus at the seventh

month were produced to a large degree by the corpus striatum operating through the extra-pyramidal motor system. That such movements could not be caused by impulses passing over the pyramidal tracts was obvious; they therefore must stand in relation to the older motor system under the general term of "extra-pyramidal" and this extra-pyramidal system, according to Dr. Hunt's views, stands in close relation with the pallidal system of the corpus striatum.

In this connection, it was not without interest to recall that myelinization of the pallidal system takes place at a period of fetal life when fetal movements have become quite active. So it was not unlikely in the phylogeny and ontogeny of movement, that reflex movements were the first to develop (spinal);—then followed automatic and associated movements (striatal);—and at a still later period of development, the isolated synergic movements of cortical origin.

(To be continued)

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

November 16, 1916

The President, Dr. Edward B. Lane, in the Chair

SPECIFIC GRANULES IN THE SYMPATHETIC NERVOUS SYSTEM

By A. Myerson, M.D.

The sympathetic nervous system contains granules of a peculiar kind, found elsewhere only in the substantia nigra, locus cœruleus, and spinal ganglia. These granules are to be looked for after the fat has been energetically removed (by ether, alcohol, chloroform, or acetone) and are then peculiarly distinguished by the intense way they reduce silver. They are, therefore, called "argyrophilic." They do not occur in the cortex, cerebellum or cord. They are believed to relate to some pathological process and according to Calligeris, who has studied them by other methods and calls them the *black granules*, they are not found in animals. If this be true, they are associated either with some specific human anatomical or physiological feature, or some specifically human pathological process.

It is necessary to emphasize in technique that silver-reducing substances are present in the cells throughout the nervous system, but that these particular silver-reducing granules are present after the fat has been removed and then are found only in localities above mentioned.

AUTOPSY MATERIAL OF POLIOMYELITIS EPIDEMIC OF 1916

By M. M. Canavan, M.D., and E. E. Southard, M.D.

At the last meeting Dr. Southard reported the autopsy material that came to the commission on mental diseases. The present report is on a limited number of autopsies, five or six. Not much etiological work of importance has been accomplished, and not much significance is attached to the autopsy findings. Mallory's work at the Boston City Hospital tends to negative Rosenow's work on streptococcus. Of those cases that died within a few hours after the onset, there were found few foci of congestion; there was

no hemorrhage and the original lesions were not hemorrhagic. The lesions were focal. Plates shown demonstrate focality, first, within the parenchyma and these were not in relation to nerves or vessels in all cases. The foci resemble those of a pyemic process and are made up of half polynuclears and half lymphocytes. They resemble a spirochete lesion. Secondly, there are lesions in the meninges. Thirdly, there are focal lesions in the Gasserian ganglion in one case. Again, there are focal lesions in the muscles and choroid plexus. Meningeal and myelitic lesions are well known in experimental work, although in the monkey one does not make the diagnosis without hemorrhage. In one there is a focus of congestion in the pituitary body. If lesions are in the Gasserian ganglion, the choroid plexus, muscle and meninges, why not look elsewhere?

TACT AS A QUALITY OF ACHIEVEMENT IN NURSING

By Henry C. Hall, M.D.

Criticism of current terminology concerning the quality in its relation to the application of acquired knowledge by the nurse.

In an ultimate analysis, doubtless, tact must be placed as a moral attribute but primarily and essentially in its practical application the element may be framed as an intellectual talent, a quality of discernment directed toward the problem of how in contact reactions of one personality with another offense may be avoided.

The trend of opinion concerning the activities of the trained nurse would indicate that the graduate nurse is not a finished product.

Cause found in deficiencies of prevalent educational schemes.

Tact treated under two headings; in the educator in relation to a discriminative choice of subjects which shall constitute true right and effective curriculum, and in the graduate nurse in relation to the application of acquired knowledge in the field of nursing.

Prevalent educational schemes in the profession of nursing.

Scheme A.—The study of anatomy and physiology, practical nursing, materia medica and therapeutics and the collative observation of the indications of health and disease in the several functions *except* the brain as an organ of the mind. In vogue in general hospitals.

Scheme B.—The study of anatomy and physiology, practical nursing, materia medica and therapeutics and the collative observation of the indications of health and disease, not omitting the central function, namely, the brain as the organ of the mind. In vogue in mental hospitals.

The Need in the Education of a Nurse.—A more general recognition by the clinician of the indications of the mental symptom-group as an equivalent or causative factor in disorder or disease of a given function; again an addition to the corps of instructors of medical men or especially trained persons who possess the faculty of inculcating the practical lessons of psychic fundamentals; again the qualification of the nurse in the knowledge of the everyday manifestation of the primitive instinct of self-preservation, of the fact that there is a two-fold application, namely, observation of the physical self and a defense of the mental self, and that inasmuch as "conduct is based not upon doubt and hesitation and suspension of judgment but also upon coherent belief, upon assured conviction," that in whatever form presented in the hospital or home, whether the type be characterized by unnecessary anxiety, fretfulness, crabbedness or ungratefulness, the nurse's attitude should be unvaryingly not that of a passive endurance fortified by the Christian graces in common vogue, nor yet that of a mere toleration of the uninteresting, annoying, aggravating types so commonly met with, but essentially of an

active interest in the psychic indications of health, disorder and disease of function, an interest equaled in degree only by that shown toward the indication of a deprivation of pure air and food products.

Tact in Relation to the Application of Acquired Knowledge.—An analysis of tact, including the consequences of an offense upon the body functioning and the qualities of conduct, namely, consciousness and unconsciousness of offense given.

Inasmuch as all offensive acts are admittedly those of an unconscious character, might it not be well for instructors in training schools to abandon the common objective viewpoint, based on moral motive and consequence, and to adopt the subjective viewpoint, namely, to develop in the nurse the talent tact, by instilling in daily acts the need of an unremitting practice of giving watchful attention to the elements making up her own individuality, her attire, mannerisms, gossipy traits, forms of language and qualities of voice modulation, to the end that no element or group mixture when in contact with a patient shall be so far removed from the acceptable as to excite a painful experience in the patient whom she is serving, for thereby does she inevitably place a handicap upon cell-integration? The nurse should be taught to recognize that inasmuch as by facile practices she may be a "carrier of disease germs to the menace of her patient's life," equally so she may be a possible "carrier" of impressions productive of cell-disintegration.

As a complement to self-knowledge, the quality of observation should be unfolded. The nurse should be taught to be unremittingly watchful not alone of her own group elements of individuality but also to be observant of the signs of emotional reaction in the individual treated. Particularly she should habitually bear in mind the facial expression, wherein may be readily recognized by the trained observer an unfailing index of every passing emotion.

Such, indeed, is the value of noting emotional expressions that the statement cannot be challenged, namely, a nurse should be equally as observant of the facial lines of her patient as she is uniformly in daily routine of temperature, pulse and respiration.

Dr. P. C. Knapp said our nurses now are often far from ideal. The nurse should be taught tact, her most necessary quality, if it can be done, but nurses now have too little time to learn it. Training schools are seeking to train the nurse to supplant the physician; the nurse has courses in pathology, bacteriology, etc.; in fact they are taught everything but how to care for the patient. The aim of nursing is now not to develop a woman who can care for a patient, and nurses openly admit that they are fit to prescribe and that the doctor need only be called in occasionally. The matrons have been doing most of the training. This is a mistake. The physician should prescribe the courses and do the teaching. There is also too much routine and red tape in hospitals; if this could be abolished, the nurse would have more time to care for her patient. As it is now, the nurse will often not know the most essential facts about a patient, such as whether the patient slept or not.

Dr. G. A. Blumer spoke of the astonishment with which he had listened to the views enunciated by Dr. Knapp, characterizing them as reactionary, though surmising that the critic could hardly have meant one half of what he had said. If the modern nurse was successfully supplanting the doctor, the explanation might possibly be that she was more efficient, in the given case, than the man supplanted. He went so far as to say that remembering the meager professional equipment with which the young physician started out to practise when he graduated thirty-seven years ago, he would rather trust himself to the tender mercies of the modern well-trained nurse than to the young average doctor of that period.

Dr. H. B. Howard said there is no training school in this city where the nurse does not know the patient's condition; she adds wonderfully to the

patient's progress. Dr. Howard is amazed at Dr. Knapp's attitude. The nurses take pains with the patients that the doctor never would do for more than a day or two; the doctors prescribe the courses and do the directing of the teaching. It is true that nurses get little training in mental work, but in hospitals where there are mental wards, they ought to get adequate training in that. There is not a training hospital in the city but has five or six college graduates among its nurses.

Dr. Nichols said there is a good deal of difficulty, especially in state hospitals, with the problem of nursing. Many hospitals, because of remoteness to large cities, cannot obtain sufficient nurses that have the education required in a large city hospital. There are more hospitals than fifteen or twenty years ago, hence it is more difficult to obtain nurses with much preliminary education. But the training schools must continue and keep their standards as near that of the city hospitals as possible so as to be able to meet the requirements of registration in the various states. It is difficult in a state hospital to keep the standards up to a large city hospital, where many nurses are college graduates. Thus with great effort nurses from state hospitals are kept up to an acceptable standard. Tact is something inborn; it can be developed in those from the humblest walks of life. It should be impressed on the nurse that her duty, besides following the physician's orders, is to promote the comfort of the patient.

Dr. E. B. Lane said he believed that tact is a gift which is not often acquired, but if there is a possibility of acquiring tact, there is no better school for doing this for a nurse than working in an insane hospital. Because of the large number of calls for nurses to care for mental cases he believed it would be wise if more nurses were obliged to take a course with mental cases to fit them for work later in life.

Dr. Hall thought Dr. Knapp's type of nurse is an unusual product rarely or never met with in his own professional experience. The doctor appeared to have lost the point of argument. Prevalent methods of teaching, the qualities of achievement from a moral basis (right or wrong) were condemned. A physical basis was advocated, namely, the development and cultivation in the individual nurse of the critical faculty, tact in the direction of how in contact reactions, pleasurable feelings which favored cell-integration may be presented to the patient and not a painful experience which increases cell-disintegration.

In his own experience nurses have been known to be sleepless the night following the advent of a tactless physician in hospital routine, or they have been absolutely confused as to orders given by a physician whose mannerisms were nearly always of a painful type. Possibly in the instance cited by Dr. Knapp, the nurse was suffering from a similar condition.

Translations

VEGETATIVE NERVOUS SYSTEM

By H. Higier, M.D.

Authorized Translation by Dr. Walter Max Kraus, A.M., M.D., New York

(*Continued from page 142*)

Of the various theories concerning the function of the parathyroids (Pineles, Chvostek, Pfeiffer and Mayer, Eppinger, Falta and Rudinger) that of Falta and Rudinger is, in my opinion, the best. This theory is that the parathyroids have a very definite relationship to the vegetative nervous system.

The precise experiments of Falta and Kahn have shown us the following in relation to this most interesting of questions. The symptoms of tetany result in the main from a state of over-irritability or over-irritation of the nervous system in its motor, sensory and vegetative parts.

The over-irritability of the vegetative nerves, particularly noticeable in the acute stages of tetany, is not only mechanical but, as experiments with adrenalin and pilocarpin have shown, also chemical. The end organs of the vegetative nerves are the site of many symptoms of over-irritation (Ibrahim, Falta)—pylorospasm, spasm of the internal sphincters of the bladder and intestines, angiospasm, spasm of the ciliary muscles, disturbances in the heat-regulating system, increased cardiac action, angiospastic edema, transient leucocytosis, hypersecretion of various glands, sweat, salivary, lachrymal, gastric and intestinal, and so forth.

All the manifestations and disturbances of intermediary protein metabolism are assumed to be due to increased irritability of the ganglion cells of the spinal cord, from which both the somatic and vegetative neuroses arise. It is chiefly the peripheral neurones which are in a state of over-irritability, but higher neurones as well may be found in this condition.[7]

[7] See chapter on Tetany in Jelliffe and White, Diseases of the Nervous System, 2d ed., 1917, for a more searching analysis of this situation.

According to the same authors, the parathyroids normally act as a depressant upon the irritability of the ganglion cells, perhaps by increasing the intracellular calcium assimilation in the central nervous system. When the parathyroids are unable to cope with normal or increased demands on the part of the body, a state of over-irritability of the nervous system develops.

That it is not nerve or reflex paths primarily which cause tetany, but adrenalin substance from the parathyroids, is shown by the fact that a parathyroid gland free of nerve and blood supply which has been successfully transplanted between the abdominal fascia and musculature will serve the function of a normally placed parathyroid and will prevent tetany.

Georgopulos maintains that it has not been proven that the parathyroids exert an inhibitory action upon the secretory action of the chromaffin tissues, but, in the light of the work already done, supposes that action is limited to an inhibition of the action of the secretion of the chromaffin system.

It is very hard at the present time to say whether myoclonia, myasthenia, and myotonia are, as Lundborg claims, due to a disturbed functioning of the parathyroids. As little settled is Chvostek's theory of the antagonistic relations of tetany and myasthenia to the parathyroid glands and the vegetative system. According to this theory tetany with its spasms, increased irritability and psychic irritability, is due to parathyroid hypofunction, while myasthenia with its fatigue, diminished irritability and psychic depression is due to parathyroid hyperfunction. The antagonistic and stimulating actions of the parathyroids are, however, not yet clearly understood. The subject is by no means a closed one, and the complete elucidation of this complicated matter is coupled with many almost insuperable difficulties which in being overcome will, without doubt, cost experimenters not only great trouble but much time.

(*g*) The sex glands and the hypophysis are placed side by side in the scheme of metabolism worked out by the school of van Noorden. The recent investigations of Aschner have demonstrated a singular dissociation. As far as the links in the chain of endocrinous glands can be worked out, it seems that the hypophysis and sex glands are synergistic in their influence upon fat and protein metabolism, antagonistic in their influence upon calcium and carbohydrate metabolism. It is well known that they have much to do with the form of the body in general and with skeletal growth and secondary sexual characteristics in particular. Less certain is the question discussed on a former page of the relation of the hypophysis and the nearby

vegetative trophic centers lying in the midbrain hypothalamus to the trophic changes and disturbances of metabolism of youthful and more particularly of adult individuals.

The libidogenous hormone comes most probably, but not certainly, from the testicle which, besides the spermatogenic cells, contains the interstitial cells of Leydig. It is these latter, in all probability, and not the spermatogenic cells which furnish the libidogenous hormone. Both the size and the number of these Leydig cells diminish after castration and in old age. On the other hand, the selective action of the X-ray destroys the spermatogenic elements, but leaves the libido intact.

I shall not discuss at any greater length these interrelationships which seem to have so little to do with our subject, the vegetative nervous system. They are but meant to recall the long recognized fact that, as Munzer has said, we are not in a position to say that any endocrinopathy, particularly of the hypophysis and sex glands, has its cause in one single pathological alteration of some particular endocrinous gland.

We shall not touch at all upon the hormones of the thymus and epiphysis, glands having an antagonistic action upon the chromaffin tissues, nor upon their relations to the vegetative nervous system. We must be entirely aware of the truth of Köhler's observation upon the difficulties which attend a separation of fact from theory in this relatively young and modern yet well-developed subject of hormonology.

In the growth of the significance of this subject, we must beware lest the endless profusion of details which experiments yield on all sides should not lead us in our zeal to draw conclusions from what is still purely hypothetical, and to believe things clear which can not yet be clearly made out in the gray distance of theory.

This youthful and yet hopeful branch of medical knowledge deserves without doubt a pronounced place in physiology, while in the clinic also vegetative or visceral neurology must take its proper position. The neurologist must also regard it his duty to include these subjects within his domain.

(*To be continued*)

Periscope

Revue Neurologique

Abstracted by Dr. Carl D. Camp, Ann Arbor, Mich.

(An. XXII, No. 15, March, 1915)

1. Reflexes of Defense (Clinical Study). J. Babinski.
2. The Condition of the Reflexes in Complete Section of the Spinal Cord. J. and A. Dejerine and J. Mouzon.

1. *Reflexes of Defense.*—The reflex of defense may be either of the flexion type or the extension type or a combination of the two. It may exist in the upper as well as the lower extremities. It may be elicited in various ways—pinching the skin, faradism, etc. Its intensity varies greatly, and may change in a few hours, in the same patient. While it usually accompanies increased tendon reflexes, there is no constant association. In Friedreich's ataxia, for instance, the reflex of defense is very active while the tendon reflexes are frequently lost. One of the most valuable conclusions to be derived from its study is the determination of the lower limit of a spinal cord compression by outlining the area in which the reflex may be obtained. Precautions to be observed in taking the reflex are: to be sure that the movement is not voluntary and also to be sure that the movement is not one of the spontaneous movements of the extremities that occurred coincidentally with the stimulus.

2. *Reflexes in Complete Section of the Cord.*—Seven observations, all except one of war injuries to the spinal cord followed by complete paraplegia. In all cases the tendon reflexes were abolished. The skin reflexes, plantar, reflex of defense, cremasteric, anal and abdominal were present, and, in some cases, increased. In all except one the plantar reflex was flexion. The reflexes varied both as to intensity and type at different times.

(An. XXII, No. 16, April, 1915)

1. The Reflex of Automatism Spoken of as Reflex of Defense. P. Marie and Foix.
2. Subacute, Hemorrhagic Polio-encephalitis of Wernicke with the Syndrome of the Red Nucleus. Modification of the Cerebrospinal Fluid and Otitic Complications. Egas Moniz.
3. Case of Death Following the Injection of Neosalvarsan. Jules Morawski.

1. *Reflex of Automatism.*—These reflexes consist of three principal types: phenomenon of flexion, phenomenon of extension and phenomenon of crossed extension. Phenomenon of flexion is the more frequent and more important. It varies somewhat in form, being accompanied by a little abduction or adduction and sometimes extension of the toes. The crossed extension reflex is rare. These reflexes also occur in the upper extremities. The author objects to the term "reflex of defense" because, although the movement appears as a defensive movement in some instances, in other cases it is

quite the reverse, so that the limb approaches rather than withdraws from the irritating contact. In hemiplegia this reflex occurs very early. In old hemiplegia it is present on the paralyzed side, although sometimes there is a crossed reflex. The reflexes are present in paraplegias of different origin, but particularly in paraplegia due to compression.

2. *Polio-encephalitis.*—The patient was a man, aged 31 years. He developed a bilateral ptosis and a sensation of bruit in the head, but no pain. He could walk, but with a tendency to fall to the left. There was a complete bilateral paralysis of the third and fourth cranial nerves and no reaction of the pupils to light or in accommodation. The plantar reflex was normal and sensation was normal. There was a slight adiadochokinesia on the left. No apraxia. The patient gradually became worse and developed profound somnolency. The pupils became unequal, the left pupil very dilated. The Wassermann reaction was negative. A lumbar puncture showed a yellowish liquid with abundant red cells. About three weeks after the beginning of his trouble he developed a running ear on the left side and from this time on he gradually recovered.

3. *Death Following Salvarsan.*—The patient was fifty-one years old and had had a specific infection for three years. Six months before he entered the hospital he manifested a disturbance of memory, change in character, trouble in writing and speech and had delusions of grandeur. The Wassermann reaction was positive on the blood and spinal fluid. The diagnosis was severe general paralysis. On January 26 he received three tenths gram of neosalvarsan in 2 c.c. of distilled water. The following evening the temperature rose to 38° C. On the thirtieth of January he received a second injection of 0.45 gm. of neosalvarsan in 2 c.c. of water. Forty-five hours afterwards he had an attack of loss of consciousness, acceleration of pulse, irregular respiration and the temperature fell to 35° C. There was conjugate deviation of the head and eyes and the temperature rapidly rose to 40.7° C. and the patient died. All precautions had been taken with reference to the water used and the author believes that the unfortunate result was due to vascular changes.

(An. XXII, Nos. 17–18, May–June, 1915)

1. Lesions of Nerves in War Injuries. J. Babinski.
2. Clinical Individuality of the Peripheral Nerves. Pierre Marie and Mme. Athanassio-Bénisty.
3. Continuous Partial Epilepsy of Traumatic Origin. Trephining. Cure. Aug. Pollossou and F. J. Collet.
4. Clinical Researches on Farado-cutaneous Pain Sensibility. E. Carati.

1. *Lesions of Nerves.*—Among the chief diagnostic difficulties is the distinction of weakness due to nerve injury from that due to severance of tendon or muscles. This is especially difficult when nerves are slightly injured in the same region. Many cases present evidence of paralysis due to nerve lesion but complicated by hysterical paralysis. Many of these cases are due to faulty treatment at the front and medical suggestions. Nerve section by bullets is rare, in most cases the nerve is merely contused. In cases of median nerve paralysis faradization of the biceps causes a more marked supination of the forearm than in the sound extremity. This is due to the lack of tone of the pronators.

2. *Clinical Individuality of Peripheral Nerves.*—Injuries to the radial generally give rise to but little pain, sensory or trophic disturbance. The phenomena are paralytic. Injuries to the median nerve are divided into two clinical types. The first is paralytic and not painful, though there are generally marked vasomotor symptoms. In the painful form the paralysis is not

marked but the hand assumes a peculiar attitude with the thumb in the palm. There is frequently a tremor of the fingers, especially the first three, the fingers are white and the hand looks delicate. The part is extremely painful and the pain is augmented by the slightest contact. There is generally a hypesthesia to touch, but a hyperesthesia to pinpoint. Injuries to the ulnar nerve are not especially painful, but objective sensory changes are generally distinct. Injuries to the sciatic, as in the case of the median, are divided into painful and non-painful types.

3. *Continued Partial Epilepsy.*—The patient was injured by a ball that struck the vault of the cranium. There was no loss of consciousness, but an immediate development of awkwardness in the use of the left hand. Two or three hours later the patient noticed the movements of the left hand which consisted of a constant flexion and extension movement of the fingers at the rate of about five a second. There was no astereognosis of the left hand. Trephining disclosed no apparent injury to the skull, but a small extradural hemorrhage. The dura was not opened. Following the operation the patient had two attacks of left-sided Jacksonian epilepsy. Fifteen days after the operation the movements ceased and two months later the man rejoined his corps.

4. *Farado-cutaneous Pain Sensibility.*—The use of the faradic current in testing pain sensibility is more exact and the limits of disturbed sensation are generally wider than with other means of testing.

American Journal of Insanity

Abstracted by Dr. Chas. L. Allen, of Los Angeles, Cal.

(Vol. 73, 1916, No. 2)

1. What the State Hospital can do in Mental Hygiene. W. L. Russell.
2. Art in the Insane. C. B. Burr.
3. Huntington's Chorea in Heredity and Eugenics. C. B. Davenport and E. B. Muncie.
4. Environmental Origin of Mental Disease in Certain Families. L. V. Briggs.
5. Duration of Paresis Following Treatment. W. R. Dunton and G. F. Sargent.
6. Treatment of Cerebrospinal Syphilis. L. W. Grove.
7. Syphilis in the East Louisiana Hospital for the Insane. C. S. Holbrook.
8. Psychograph of Rossolimo. B. Parker.
9. Further Recollections of a Psychiatrist. James M. Keniston.

1. *What the State Hospital can do in Mental Hygiene.*—A review of what has been accomplished by the extension of the work of the state hospitals to patients without their walls through the follow up system, field work and lectures to the general public by the staff. The state hospital is the natural center for all information with regard to problems connected with mental hygiene and prophylaxis and the fact that physicians engaged in work in these institutions have abandoned their attitude of narrow exclusiveness to the needs of the patients within their institutions and are devoting themselves more and more to the wants of a very large class of people who may never need to be interned, is one of the greatest advances in practical psychiatry.

2. *Art in the Insane.*—A very interesting discussion of the meaning of various drawings, etc., by people confined in institutions, and their value as indicating especially their emotional states and complexes. This should be

read in the original by those interested, as it is impossible to do justice to it in a review and apart from the illustrations.

3. *Huntington's Chorea in Relation to Heredity and Eugenics.*—Dr. Muncie as field worker for the Eugenics Record Office was set to collect data upon this disease (originally started by Jelliffe) which seems to have originated in this country in New England and the Middle States within a radius of 100 miles of this office. As a result of her investigations she was able to construct four great pedigree charts containing 441 female and 521 male choreics or 962 cases and in addition 10 cases of Sydenham's chorea. Of the individuals charted 22 per cent. are choreic, 35 per cent. are choreic or show other abnormalities. About 4,370 individuals are considered altogether.

The traits which characterize chronic chorea are: (1) Persistent tremors of the head, appendages and trunk; (2) the onset of such tremors in middle or late life; (3) the progressive nature of the tremors; (4) progressive mental deterioration.

These four diagnostic characters are frequently found together but a survey of the field shows that in a good many individuals certain of these elements are absent and that there are "family complexes" which comprise others than those with the classical association of symptoms. These may be grouped into four classes: (*a*) Absence of tremor, but presence of mental deterioration; (*b*) absence of mental deterioration despite progressive tremor; (*c*) absence of the progressive element in the disease; (*d*) relatively early onset of the disease.

A study of the cases grouped under these heads permits the conclusion that the symptomatology of chronic chorea is dissimilar in different strains or families and that there exist certain "Biotypes" in which several members of a fraternity or in two or more generations show a specific complex of symptoms.

The authors then illustrate some of these biotypes by examples. In general the symptomatology of chronic chorea is different in different strains of families. The age of onset, the degree of muscular involvement, the extent of mental deterioration all show family differences and enable us to recognize various species of the disease.

In general the choreic movements never skip a generation and in other respects show themselves to be a dominant trait. The mental disorder is usually of the hyperkinetic or manic type and this also is a dominant. The age of onset tends to diminish in successive generations, but this is, at least in part, illusory, as the comparison between grandparents and grandchildren is not on the same basis. Those developing the disease young, do not marry and get children. Many nervous traits are recorded among the relatives. Thus, epilepsy 39 times, infantile convulsions 19 times, meningeal and brain inflammations 51 times, hydrocephaly 41 times, feeblemindedness 72 times. Sydenham's chorea 11 times, tics 9 times, mostly in one small family. It can be shown that these 962 cases of chorea originated from six or seven ancestors who settled in eastern Long Island, south central and southwestern Connecticut and eastern Massachusetts and a map appended shows that from these foci the disease has spread along the lines of immigration to the Pacific Coast. (The reviewer has encountered at least one case certainly connected with them, in Los Angeles.) The disease has been handed down almost without a break and though for generations the heredity has been recognized and there have been individuals who for this reason avoided marriage, this voluntary abstention does not occur to any marked degree. Among these families people of high class mentally are by no means wanting, since they include legislators, professors, ministers, authors, one judge and one eminent surgeon, though some of these broke down later in life. Many of the cases

showed later lack of responsibility, immorality and tendency to alcoholism. This very interesting study shows well how a few people may transmit to a long row of descendants characters which will make them dependents upon the state, and the authors suggest that it is the plain duty of the state to investigate and concern itself with the progeny in every case of Huntington's chorea. "It would be a work of far-seeing philanthropy to sterilize all those in whom chronic chorea has already developed and to secure that such of their offspring as show prematurely its symptoms shall not reproduce."

4. *Environmental Origin of Mental Disease in Certain Families.*—The author, who has long felt that we make too free use of "that very convenient but damnable word heredity," offers here a mass of statistics from the Massachusetts state hospitals which he offers as suggestive of the vast possibilities in the causation of insanity in family cases. As his information is nearly all in tabular form it cannot be well abstracted and the author presents it for what it is worth, hardly daring to draw conclusions. He hopes to follow it up some day with a more intensive study, and feels that much more work of this kind must be done before we can estimate hereditary influences justly.

5. *Duration of Paresis Following Treatment.*—The authors, comparing the duration of ten cases of general paresis treated by the Swift-Ellis method with 73 cases treated by mercury alone, mercury and potassium iodide, general tonics and no drugs at all, find the surprising fact that while under the Swift-Ellis treatment they observed the greatest improvement, the longest of these cases lived but two years and nine months, the average duration of life being one year and nine months, against an average of three years and ten and a half months under the other forms of treatment or over two years prolongation of life in favor of the older methods. The number of cases in which the Swift-Ellis method was used is, however, too small to justify any such sweepingly unfavorable conclusion as to the merits of this treatment.

6. *Treatment of Cerebrospinal Syphilis with Report of Cases.*—Under the above head, the author includes tabes and general paresis as well as what is usually designated cerebrospinal syphilis. He reports nine cases treated with salvarsan, intravenous and intradural, followed by mercury and mercurialized serum. Of these cases four were general paresis, three taboparalysis and in two the diagnosis is not stated. Of them three cases have been discharged as clinically well with a negative or weakly positive Wassermann reaction on the spinal fluid, two have improved but the Wassermann is still positive, and four did not improve, two having died and two are failing.

7. *Syphilis in the East Louisiana Hospital for the Insane.*—A "Wassermann Survey" of sixteen hundred patients in the above institution. Of 637 white males 8 per cent. gave a positive Wassermann, of 516 white females 4 per cent. reacted positively, while for the colored patients 212 males gave 4 per cent. positives and 235 females gave 7 per cent. positives. Of 760 white males admitted in the past ten years 14 per cent. were paretics. Of 251 colored males 11.2 per cent. were paretics, while for 231 colored females the percentage of paresis was 4.3. The general average was 8.5 per cent. paresis.

8. *The Psychograph of Rossolimo.*—The determination of the mental status of the individual is based upon the investigation of nine mental processes arranged in three groups thus:

I. Tonus—
  1. Attention.
  2. Will.
II. Impression—
  3. Perception.
  4. Memory.
III. Associative Processes—
  5. Comprehension.

6. Construction, ability to combine.
7. Skill in mechanics.
8. Imagination.
9. Observation.

Ten is taken as the standard maximum score and the results are recorded upon a square piece of paper, the performance under each of the nine heads being indicated by its height above a base line, so that deficiencies are at once perceptible. The authoress discusses the apparatus used, methods with directions and results possible of attainment. These it is impossible to consider in a short review, so that the article should be read in the original by those interested.

9. *Further Recollections of a Psychiatrist.*—Another contribution from Dr. Keniston who gives an interesting account of practice both in and out of institutions as it was a generation ago.

Archiv für Psychiatrie und Nervenkrankheiten

Abstracted by Dr. E. W. Taylor, Boston

(55. Band, 1. Heft)

1. Paranoid Psychoses in the Old. Seelert.
2. Pathogenesis of Psychogenetic Twilight States. G. Heilig.
3. Contribution to our Knowledge of the Significance of the Island for Speech and of the Left Hemisphere for Left-sided Touch. Kurt Goldstein.
4. Concerning the Metameric Division of Peripheral Pain Occurring in Diseases of the Organs of the Small Pelvis. Michael Lapinski.
5. A Contribution to the Histology of the Senile Brain Cortex. Ernesto Ciarla.
6. The Abderhalden Protective Ferments in Psychiatry. F. Sioli.
7. Supplement to the Article: Ataxic Tabes and the Treatment of the Post-syphilitic Diseases of the Nervous System with Mercury and Salvarsan. S. Tschirjew.
8. Artificial Abortion in Psychical Disturbances. E. Meyer.
9. The Diagnostic Significance of the Weil-Kafka Hemolysis Reaction for Psychiatry. E. L. Brückner.
10. Pathological Anatomy and Pathogenesis of Juvenile Paresis. Scharnke.

1. *Paranoid Psychoses.*—Seelert has made a study of so-called paranoid psychoses in the old on a basis of a series of carefully reported cases; and concludes, in view of the fact that in almost all of these cases cerebral symptoms of organic genesis occur, and that in many of the cases an abnormal mental constitution may be demonstrated, it is safe to assume that the symptomatology of these paranoid psychoses in the later years of life represents an endogenous individual reaction on the basis of a slowly progressive organic cerebral process. It is desirable that further clinical observations from the point of view indicated, together with anatomical pathological investigations, be undertaken, thereby advancing our knowledge of these psychoses.

2. *Psychogenetic Twilight States.*—Heilig reports at great length a case of psychosis which both through its course and its symptomatology must be regarded as a unique disease picture, making it difficult of inclusion among the recognized psychoses. It began rather acutely, extended over several months, and ended suddenly in a return to health. During the greater part of its course, there was amnesia, and the writer considers himself justified in

considering it a twilight state. By this term he means to convey, not a diagnosis in an etiological or pathological sense, but rather the main characteristic of its course. Such a terminology does not in the least help towards an understanding of the psychopathological process. A discussion of the symptomatology with reference to the literature follows, and the question of simulation is discussed. The case is finally regarded as a clear cut "psychological psychosis."

3. *Speech Zones.*—In the case described by Goldstein, the pathological lesions essentially of the left hemisphere were large cysts which anteriorly began in the dorsal portion of the anterior central convolution and reached their greatest intensity in the posterior central convolution and in the supramarginal gyrus and inferior parietal, severely damaging the white matter, which in part was destroyed, finally reaching to the cortex and also injuring this severely. The cysts posteriorly grew smaller and ended at a line which ran through the posterior end of the corpus callosum. In addition to the direct injury caused by the cysts, the region of the island suffered severe compression, which reached its greatest intensity in its central portion. The rest of the lesions, which were in the left hemisphere, led to a symptom complex in which aphasia and bilateral ideational apraxia with disturbance of the touch sense and the deep sensibility were combined. In addition to the typical result in such lesions of aphasia and ideational apraxia, the case demonstrated that lesions in the left hemisphere when they particularly affect the region of the supramarginal gyrus, cause also a diffuse interference with the function of the entire left hemisphere, leading to the picture of ideational apraxia of the Liepmann type. The aphasia was essentially caused by the pressure of the lesion. Spontaneous speech was reduced, understanding of speech was imperfect, repetition was interfered with, spontaneous writing was lost, also dictation, copying was less disturbed, reading was wholly lost. The case further proved that both for the touch sense as well as for the judgment of movements of the left hand, the left hemisphere is concerned. In general, the greater importance of the left hemisphere in psychical processes is demonstrated.

4. *Peripheral Pain Metameres.*—On the basis of an embryological and developmental study, Lapinsky shows that disease of pelvic organs may be associated with pain in peripheral portions of the body, the location of the pain depending upon certain anatomical facts brought out by a study of the relation in embryological development of pelvic organs to the extremities.

5. *Senile Cortex.*—Ciarli has studied a number of brains, especially of senile dements, for the purpose of bringing out certain histological details relative to the senile plaques or the so-called Alzheimer neurofibril changes. The alterations of the neurofibrils as pointed out by Alzheimer are described. The Donaggio neurofibril stain was found particularly appropriate for demonstrating the finer histology of the plaques. It is concluded that the senile plaques represent necrobiotic processes in glia cells and possibly also in surrounding nerves and non-nervous tissues which are closely associated with the diseased glia cells. It is possible also that the plaques may represent an age alteration of glia cells, and that the Alzheimer neurofibril changes may be classed in a similar category.

6. *Abderhalden Tests.*—Sioli concludes from his own studies as well as by reference to the literature that the results gained by Abderhalden's method are not sufficiently uniform as to be of value either for diagnosis or prognosis in the psychoses. The very numerous sources of error prevent the method being of general usefulness. It demands further investigation.

7. *Ataxic Tabes.*—Tschirjew briefly reiterates his somewhat radical views regarding the treatment of the post-syphilitic diseases of the nervous system. He believes that chief reliance should be placed upon mercury; but when

arsenic may be demanded, that it should under no circumstances be administered intravenously but rather by mouth or by injection directly into the tissues.

8. *Abortion in Psychosis.*—The practical question of abortion in mental disease is discussed by Meyer, who believes that in the so-called functional psychoses, particularly in dementia præcox and manic depressive insanity, artificial abortion is not indicated; nor is it advisable in paresis or epilepsy. It is possibly justified in conditions of depression on a psychopathic basis. The question of sterilization is also discussed, but in all such cases it is especially necessary that the individual case be most carefully analyzed before such a radical procedure is entertained.

9. *Weil-Kafka Reaction.*—The reaction devised by Weil and Kafka, Brückner thinks of considerable value as a diagnostic measure in psychiatry. It is found as a rule in paralysis. It does not occur in non-luetic subjects. On four occasions it was found positive in constantly negative Wassermann reactions; and in two instances it was the only positive reaction among all that were used, excepting the gold reaction. It offers, therefore, when there is clinical evidence of paresis, a valuable prop to the diagnosis. How far it is of value in distinguishing between cerebral syphilis as contrasted with the non-malignant transient meningeal affections of syphilitic origin, is not as yet determined.

10. *Juvenile Paresis.*—Scharnke speaks of a case reported by Rosenfeld of apparent juvenile paresis in which the attempt was made to relieve the symptoms by a cerebral decompression after the method of Cushing. The operation resulted in an improvement of symptoms, which, however, was only temporary, and thenceforth the patient grew rapidly worse, and died about three years after the first appearance of the symptoms. The autopsy, of necessity postponed for thirty-eight hours, revealed interesting facts, although too late to demonstrate the spirochetes. The brain showed atrophy, there was hyperostosis of the cranium, internal pachymeningitis, and chronic leptomeningitis. The brain in general was markedly atrophic, particularly the cerebrum. In addition to various abnormal histological findings in the cerebrum, particular interest attached to changes in the Purkinje cells of the cerebellum. Although the cerebellum did not appear atrophic, the Purkinje cells showed very definite changes, particularly in the demonstration of cells with double nuclei, which has before been observed in the cerebellum of adult paretics, and in higher percentage than in other mental diseases.

Book Reviews

Hindu Mind Training. By an Anglo-Saxon Mother. With an Introduction by S. M. Mitra. Longsmans, Green and Company, London, New York.

The unsurpassed naïvetè of the psychology which this book upholds, advocated by its sponsor in the introduction, seems to be the trap into which the author has delightedly fallen. The only meaning or excuse, if excuse it can wholesomely be, for the existence of such a book lies in the Nirvana-like view of education and its insipid indulgence in its less than puerile discussion of questions suggested by the fable basis of the method of teaching. For we believe that even the puerile, rather the true child's mind, welcomes as its own natural right the intellectual conflict which marks the wrestling with algebra or any other mental problem and advances by it. The understanding and control of one's full mental possession and equipment, conscious and unconscious, is better served by a synthesis which comes through an effort at unification and direction than through placid contemplation with the empty and pointless repetition of a few commonplaces, which purport to be the bringing up from the wondrous depth of the human mind the power that is there. Power which lies in an evolutionary unfolding and growth is a far more real thing than a contemplative lying by to see things adjust themselves. Nor can such a method ever indeed penetrate with any recognition into the storehouse of the human psyche.

The whole scheme of the psychology of the book which finds mind residing not in the brain alone but in every cell of the body is entirely foreign to the dynamic conception which conceives mind an unmeasurable force which has merely prepared and uses brain and other body cells for its expression and progress. The comparison of the Hindu system of education with the philosophy of western thinkers reveals throughout this lack of the element of a progressive evolution. The readiness with which the author of the book is carried away into such a scheme called education is evidence of the readiness of the indolent side of the human psyche to find plausibility in inertness and allow the more wholesome and essential tendency to advance to be overwhelmed. Such victims of Hindu teaching lose sight of the venerable criterion of philosophy and education, "By their fruits ye shall know them." Shall the fruits be the lotus flower of inertia or the undying stimulus to conflict and effort out of which arise always clear-cut, well-defined proofs of useful advance? The Hindu method of gazing into the mind could never tap its dynamic sources and release energy in an adjustment which is active health. Therefore its form of attaining peace has never resulted in useful work.

Jelliffe.

The Psychology of Special Abilities and Disabilities. By Augusta F. Bronner, Ph.D. Little, Brown and Company, Boston. 1917.

The author's plea for the direction of attention to individuals who stand apart from the ordinarily recognized groups of children in educational classification is one which at once appeals to the individualistic psychologist. More and more we are getting away from thinking that the individual child can be understood through a general psychology or his difficulties be met and

adjusted by mass method. Yet rightfully does the writer claim that this attitude has as yet but little place in the arrangement of schools and their classes. For two special groups of children she speaks, the child who grades below normal in most of his capacities and yet has certain particular abilities, and the child with normal abilities generally who yet is hampered by some special disability.

She points out the lack of facilities in our educational system for recognizing such a state of things or for successfully meeting them. Instead their neglect leads to economic loss through waste of school expenditure upon individuals to whom work is not adjusted and the injury done to such pupils themselves. Besides there is the further economic loss and disturbance resulting from vocational maladjustment which is the sequel to the want of understanding and control of such situations. Many interesting cases are cited which have come to the attention of the author and her colleagues in their psychopathic work with such children. These reveal the result of the inadequacy of current school methods to discover and appreciate such particular abnormalities and provide for them the training which would properly develop each case.

The purpose of the book, however, fails to find full expression. What in reality has the writer offered to remedy the situation? There is indeed suggestion of an understanding which penetrates deeper into complex individual problems and especially emphasis upon the necessity for individual understanding and attention along the special line for each individual case. The difficulties of the problem, however, meet with no practical solution, to which the way is only barely pointed out. The slight reference to the personal work of the Psychopathic Institute does suggest that there individual defects or special abilities upon a defective basis are approached from the intricate affective side. Yet the book gives but little hint of this fuller psychological attitude. The measurements of special abilities and disabilities and their relation to the general standing of the child seem to fall too exclusively under that superficial form of psychology which measures in limited terms of intellectual efficiency, whether sense perceptions or any other form of superficial mental processes. The attempt to incorporate even the consideration of the affective side of the question into such a psychological method of testing, grading and education misses the essential element which after all supplies the guiding principle for each individual training and adjustment, as it throws light upon the nature of the peculiarity in evidence and its relation to the entire make-up. This is the recognition of the energy which lies within each life and informs both the affective and the intellectual nature of the child and produces the external manifestations of them. The book, therefore, presents these problems as just so much more material which demands a thorough awakening to that energic concept of psychology which can infuse these practical problems with a directing purpose in a deeper understanding of them.

JELLIFFE.

PHYSICAL CHEMISTRY OF VITAL PHENOMENA. By J. F. McClendon, Assistant Professor of Physiology in the University of Minnesota. Princeton University Press, Princeton. 1917.

In this introduction to physical chemistry, especially adapted for students and investigators in the biological and medical sciences, the author has given a running account of the chief physico-chemical phenomena which underlie the vital phenomena of living organisms. He begins with elementary definitions of the chief physical properties of aqueous solutions, then discusses the main reactions accompanying electrolytic dissociation and osmotic pressure. From this he advances to a study of the hydrogen and hydroxyl concentra-

tions and pressures which, with the chief modes of determination of hydrogen ion concentration and the main reactions of buffers and dissociation constants of acids and bases, makes up his fourth chapter. The difficult and intricate formulations relative to surface tension and adsorption make up another chapter. Colloidal properties, enzyme action, cell membrane permeability, osmosis and polarization of cell membranes are then discussed. Interesting chapters are those on the physical properties which permit of and further the cell phenomena of anesthesia, narcosis and cytolysis. While the closing chapters carry the physico-chemical activities which are grouped about muscular contraction, oxidation, heat formation and blood actions to practical and every day conclusions. There is an extremely useful and complete bibliography which renders the book, with its clear and lucid, though elemental discussion of fundamental physico-chemical phenomena, an extremely valuable one to both beginner and investigator.

JELLIFFE.

THE SEX COMPLEX. By W. Blair Bell, B.S., M.D. William Wood and Company, New York.

This is a study of the relationships of the internal secretions to the female characteristics and functions in health and disease.

The author here defends the thesis that the reproductive functions are directed and controlled by all of the organs of internal secretion acting in conjunction rather than by the gonads alone, as formerly thought. He thus posits a definite genital system. Parenthetically it might be remarked that we can see no good reason why the entire body, especially including the psychical side of mankind, might not be included and that Bell is as far from really describing the generative function, in terms of endocrine activity, as were those who only thought of it as gonadal. He has advanced a couple of steps, but why limit life's activities to a purely physico-chemical level even when he would add that all cells have an internal secretion.

Apart from this obvious defect he has made a good case for the interrelationship of the endocrinous system with the organs of reproduction and has brought together a mass of incontrovertible material dealing with this the somatic side of the problem; material which is gathered together in no other book in English with which we are acquainted. For this the author has rendered a distinct service.

His chapter on sex psychology is extremely interesting and judged from the naïve male attitude most sound, but seen from a larger point of view of the female as as important a part of the problem of reproduction as the male in all attitudes, this chapter is almost funny. Thus we are told that the mental attitude of women after the menopause reverts to a mental type. Apart from not knowing what a mental type is, the dictum is nonsense.

He says that the central motive of a normal woman's existence is the propagation of the species. As if this was not the central motive of all living matter; plant, tadpole, man, male and female as well—and that maleness and femaleness simply represent the mechanism which best accomplishes it. We wish the author did not continually put his cart before his horse in telling what the body did to the mind—as if in the first place they were different and secondly which led which. Is not structuralization simply an instrument provided by experience for energy to act—which when acting at physical or chemical levels does one job and at social levels another? Why say the mental condition is due to the metabolism, any more than the metabolism is due to the mental condition? Why not just as well recognize that they are mutually correlative problems and like maleness and femaleness are inseparable to the large function of living?

This whole chapter is vitiated by surface and superficial conscious psychology. It is the current patter of the tram-cars, drawing rooms and medical schools, but it is nothing more than "patter."

We have spoken thus pointedly about this work because of its great intrinsic value. Had the author had a little more breadth of view and been able to step outside of a too narrow and myopic mechanistic view of life he would have given a classic of inestimable worth; as it is it is a long way on the road to a valuable guide and even if accenting the somatic factors, such accent is needed in calling attention to a trend of recent activity of much importance.

JELLIFFE.

THE GROWTH OF MEDICINE FROM THE EARLIEST TIMES TO ABOUT 1800. By Albert H. Buck, A.B., M.D. Yale University Press, New Haven. $5.00.

This is a charming book and one well worth while. The author, who is known to all through his masterly Reference Handbook of the Medical Sciences, has prepared for physicians, young and old alike, a volume which is well adapted not only to provide entertainment and spiritual culture, but practical knowledge of the healing art as well. It is certainly an accomplishment which merits praise.

He divides his work into nine periods, Primitive Medicine, The Medicine of the East, The Medicine of the Classical Period of Antiquity, The Medicine of the Hippocratic Writings, The Alexandrian Period, The Medicine of Galen, The Middle Ages, The Renaissance and the Modern Period.

Under these groupings Dr. Buck has most interestingly written in most attractive form of the chief stages in the development of the medical art and science. Nowhere have we met with more flowing a narrative which rivets the attention and fascinates the reader with the story of a forgotten past.

The book is furthermore beautifully printed, well illustrated and is a striking contribution to American medical scholarship.

JELLIFFE.

THE INVOLUNTARY NERVOUS SYSTEM. W. H. Gaskell. Longmans, Green and Company, New York, London, Bombay. $1.80.

This is an initial volume of a series of monographs on physiology edited by Dr. E. H. Starling. It represents almost the last piece of work of W. H. Gaskell and his last word on the vegetative nervous system. As the ripened expression of the chief English investigator of the phylogeny of the nervous system it is particularly valuable in this handy and pleasant form.

Gaskell discusses the development of physiological knowledge bearing on the involuntary nervous system, carries forward its morphological evolution and physiological correlations, and finally summarizes the whole subject in terms of phylogeny. The evidence of the lowest vertebrate thus points to the origin of the sympathetic nervous system from nerve cells in the central nervous system of some invertebrate, which are motor to the vascular system and contain adrenalin in their substance. He adduces evidences from his work on the Origin of Vertebrates to carry out this analogy and he also traces the varying evolutions of motor apparatus which are to be acted upon by the adrenalin and the related antipodal or opposing substance-hormone and chalone by Schaefer, acetyl-choline.

It is a fascinating little monograph and should be read by every student of the nervous system.

JELLIFFE.

Obituary

WILLIAM MABON, M.D., New York; Bellevue Hospital Medical College, 1881; aged 56; a member of the Medical Society of the State of New York and American Medico-Psychological Association; assistant physician to the Morris Plains (N. J.) State Hospital from 1885 to 1887, and of the Utica (N. Y.) State Hospital from 1887 to 1895; superintendent of the Willard (N. Y.) State Hospital in 1895 and 1896, and of the St. Lawrence (N. Y.) State Hospital from 1896 to 1903; general superintendent of Bellevue and Allied Hospitals, New York, in 1903 and 1904, and superintendent of the Manhattan State Hospital since 1906; lecturer on mental diseases in his alma mater in 1907; president of the New York State Commission in Lunacy from 1904 to 1906; one of the best known alienists in the country. Died at his home, February 9, from pneumonia.

DR. WILLIAM MABON

The State of New York has lost one of its most valuable and devoted servants, the dependent insane one of their sturdiest champions and the field of psychiatry in the United States one of its most distinguished representatives through the death, on February 9, of Dr. William Mabon, superintendent and medical director of the Manhattan State Hospital.

Dr. Mabon began his services on behalf of the insane of New York State at the Utica State Hospital in 1887, when he was appointed by Superintendent Blumer as one of his assistants. The plan of exclusive State care of the insane was then crystallizing and every member of the Utica State Hospital staff became intensely interested in the outcome of the ensuing struggle. In the American Journal of Insanity, published at the hospital, Dr. Mabon and his associates were provided with a suitable channel for the dissemination of sound, and as it proved, convincing arguments for the adoption by the State of this most advanced policy, and in season and out of season, the public was bombarded with graphic representations of the horrors of county asylum care, of the hapless fate of the insane confined in the county poor houses and the necessity of immediate centralization of all functions having to do with these dependents.

Dr. Mabon showed special aptitude for hospital work and made rapid progress. After passing through the different grades of the Utica State Hospital staff he was, while acting as first assistant, appointed to the superintendency of the Willard State Hospital in 1895, where the high administrative standards established by him

led to his transfer in 1896 to the superintendency of the comparatively new institution at Ogdensburg, the St. Lawrence State Hospital. Here Dr. Mabon's active and original mind found full play; and the orderly and beautiful development of this fine institution can safely be credited to him. In 1903 Dr. Mabon was offered and accepted the very difficult position of superintendent of Bellevue and Allied Hospitals in the City of New York. Upon assuming this position he set about bringing order out of the chaos then existing in these institutions. This was, indeed, a man's job, and from the date of his appointment until his resignation in 1904 he labored with tremendous energy; indeed without his enormous vitality nothing could have been accomplished.

In 1904 Dr. Mabon was appointed by Governor Odell as President of the State Commission in Lunacy (now the State Hospital Commission).

The experience acquired by Dr. Mabon in the various positions held by him made his services as State Commissioner in Lunacy of exceptional value to the State. He supported with all his energy and influence the development of the scientific branches of the State hospital service and lent a ready hand to all propositions looking to the maintenance of the highest standards. In 1906 he resigned the position as Commissioner and was appointed as superintendent and medical director of the Manhattan State Hospital, the different branches of which had been consolidated.

During the past twenty years Dr. Mabon's advice as to changes in hospital policies has been sought by many different Governors and by successive finance committees of the Legislature; and it can safely be stated that he was identified with the enactment of more enlightened legislation for the betterment of the insane than any other man in the State. His forceful manner in addressing meetings, scientific and lay, secured close attention, and while his advanced theories were not at all times accepted by his hearers, his sincerity and earnestness served to rally to his support some of the best men in hospital work. His public papers give evidence of his wide knowledge of psychiatry in its latest developments, and of the positiveness that characterized all his work.

Dr. Mabon's personaliy was most engaging. He was quick in physical and mental action, and his success in life was due to his energy, his optimism, his enduring capacity for work and the quality he possessed of inspiring enthusiasm among his associates and subordinates. His decisions were quickly made and few required revision.

During the last ten years, Dr. Mabon has been active in all fields of labor in connection with the welfare, not only of the insane, but of the feebleminded and other defectives. He has served as consulting physician of the Medical Board for the Department of Atypical Children, Randall's Island, New York City; consulting alienist for the Hospital for Deformities and Joint Diseases; consulting alienist to the Neurological Institute of New York City; Professor of Mental Diseases New York University and Bellevue Hospital Medical College, New York City; and consulting alienist to the Red Cross Hospital, New York City, from 1908 to 1912.

He was also a member of the following societies: New York County and New York State Medical Societies; Academy of Medicine, New York City; Medical Association of Greater New York; New York Psychiatrical Society; Ward's Island Psychiatrical Society; American Medico-Psychological Association; National Committee for Mental Hygiene; New York University and Bellevue Hospital College Medical Society; New York Neurological Society.

Previous to coming to the service of New York State Dr. Mabon, after graduating from the Bellevue Hospital Medical College in 1881, had served as house physician and surgeon at the Jersey City Hospital for one year, and as assistant physician at the Morris Plains (N. J.) State Hospital for the Insane, from October, 1885 to March, 1887.

Dr. Mabon was born in New Brunswick, N. J., in 1860. He is survived by his widow and two daughters.

SMITH ELY JELLIFFE.

VALENTIN JACQUES JOSEPH MAGNAN

The death of Magnan, which occurred in October, 1916, removed one of the master leaders of French psychiatry and a well-known figure in the psychiatrical world at large. A long life of distinguished service in his field of work came to its close, in the words of a contemporary, "in the serenity of an evening which marks the decline of a well-filled life."

Magnan was born in Paris in 1835. His interest as a student of medicine was from the first centered upon mental disease. He served as intern at the Salpêtrière and the year after receiving his degree as doctor of medicine accepted an appointment as physician to the Asile de Sainte-Anne, where he continued throughout his active life. It was in 1867 that he entered upon his work there, where he began at once to lay the foundations of his far-reaching influence in the world of psychiatry.

One of the problems which early aroused his interest was the effect of alcohol and of absinthe, which he considered distinctively, upon the organism, as this was brought home to him through his clinical work. This was in the sixth and seventh decades of the last century when the work which has now become familiar in neurology and psychiatry was indeed pioneer work. He based his work on clinical observation supplemented by experimentation. He realized not only the effect of intoxicants which manifested itself in deliria and other mental disturbances but its vast social extent as well. Already in 1873 he was awarded a prize by the Académie de médecine for a memoir on this subject. His important work in nervous and mental cases comprised research upon deliria, convulsions, all the wide range of manifestations of mental disturbance, including work upon obsessions, impulsions and inhibitions in which he collaborated with Charcot. His especial contribution lay in the establishment of the anatomical basis of general paresis and its relation to tabes, which prepared the way for the later recognition of a common toxic agent for both. He demonstrated that the lesions of general paresis affect all portions of the central nervous system.

His attitude on medico-legal questions was based upon a conception of criminality opposed to that of Lombroso. As early as 1889 he expressed his view of the explanation of criminality in pathological and mental degeneration which could only be understood by a review of the subject's entire history, rather than in an inherited disposition and a reversive type. The marked advance in the treatment of the insane in France owed itself to the same broader conception of the individually diseased and of responsibility toward them. The conditions under which he began his work were still those of coercion, restraint by force and solitary confinement, due to an inefficient understanding of mental disease and the possibility of rational dealing with it. Against all of this Magnan directed his energies and in 1900 his position was officially recognized at the Congress of International Medicine. His continued efforts had transformed the asylum regime. All interference with the patient's freedom was abolished unless freedom meant actual danger to the patient or those about him; rest in bed and general therapeutic care replaced solitary isolation in cells. He himself lived among his patients and knew them, transforming thus his accurate knowledge of clinical facts through the breadth of human interpretation and the widening and quickening of experience which this gave him.

J. DEJERINE

He made of L'Asile de Sainte-Anne a center of training and influence which extended itself throughout his own and foreign lands through the number of alienists who sought his instruction. He was a tireless worker, a clear observer, independent but by no means narrow in his thought, firm in judgment. Above all he was the kindly and sympathetic companion of the unfortunates committed to his care and attention.

His publications were concerned with alcoholism, general paresis, hereditary insanity, delirium, sexual perversity, etc. He was made a member of the Académie de médecine in 1893 and elected to its presidency in 1915. In his will he left 21,000 francs, the interest of which is to be devoted to a triennial prize work in psychiatry or to a study of a mental disease published within a period of three years. In 1908 two hundred or more of his friends assembled to pay him tribute at the completion of forty years of service at the asylum. SMITH ELY JELLIFFE.

J. DEJERINE

On February 26, 1917, death removed another of the great figures in French neurology. Yet so important is the work which Professor Dejerine leaves to the world of neurology that his death sems to be but a passing event in a life which has won an actual and actively continuing immortality.

Dejerine was born of French parents at Geneva in 1849. His medical studies were carried on in Paris where he graduated in 1879. His interest was already centered upon the study of nervous diseases particularly their pathological anatomy. He was at once made chief of the clinic at the Bicêtre, to the staff of which he was elected in 1882. In 1901 he become professor of the history of medicine and later of clinical medicine. From here he was called to the Salpêtrière where he succeeded Raymond in the chair formerly occupied by Charcot.

Any report of his definite service to neurology must comprise a long list of contributions from his anatomical research and include those publications which occupy a foremost place in the literature of neurology. He understood well the coördination which should exist between symptom, disease entity and the anatomical basis underlying this and carried out this principle in his work. It was therefore he who contributed greatly to the anatomical and histological foundation of physiological investigation as of clinical study which has distinguished neurological work in France. His conclusions were based not on unproved hypotheses but on results of actual investigation and minute observation.

He began his study of peripheral nerves at the outset of his career and discovered a peripheral tabes resulting from peripheral nerve lesions due to neuritis, infection, intoxication, and which separated this syndrome from medullary tabes, to which it presented similar symptoms and with which it had hitherto been confused. He also discovered a hypertrophic, progressive, ascending interstitial neuritis which resulted in sclerosis of the posterior horns. Moreover he gave the name to atrophic myopathia in which he recognized two types, scapulohumeral and facioscapulohumeral.

Aphasia also claimed his attention in both its motor and sensory forms for which he established the localization of lesions in word blindness and articulate speech and determined that the source of disturbance in writing was involved in the lesion in the speech area. He performed extensive work upon the spinal cord, explaining already accepted syndromes, such as the nature of the sclerosis in Friedreich's disease, and establishing new disease entities by his enlightening investigations. Working with his pupils he discovered olivo-ponto-cerebellar atrophy and the thalamic syndrome. The knowledge of the origin and course of many of the spinocerebral bundles is due also to his research. He worked often upon degenerated tracts which could only be followed with the greatest care and patience. He traced the fibers of the base of the cerebral peduncle through their connections with the cortex, red nucleus, island of Reil, etc.

He was a tireless worker who left a lasting impression upon the neurological world through the number of his pupils, to whom he imparted his spirit of active and accurate research and who collaborated also to some extent in his work as well as in his published results. His chief publications which remain as a monument to his endeavors are first the "Anatomie des Centres Nerveux," a foundation classic in neurology, which was written in collaboration with Mme. Dejerine, interne in the hospitals and his fellow worker; "Maladies de la Moelle Épinière," written with the aid of his pupil Dr. Thomas; and "Séméiologie du Système Nerveux" in Dr. Bouchard's "Text-book of Systematic Pathology."

His life was also one of devotion to his patients among whom he served and his last efforts before his fatal illness were devoted to the alleviation of the wounded and nervously ill in the war. He was honored in 1908 by election to the Academy of Medicine and was also an officer of the Légion d'Honneur.

SMITH ELY JELLIFFE.

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Original Articles

QUESTIONS ABOUT THE DURATION AND CLASSIFICATION OF A BRAIN TUMOR*

By E. D. Bond, M.D.

FIRST ASSISTANT PHYSICIAN, PENNSYLVANIA HOSPITAL FOR THE INSANE, PHILADELPHIA, PA.

A woman of forty-nine had a history of convulsions for twenty-nine years, headaches for two years, and many of the usual localizing symptoms of brain tumor for four months before her death.

Autopsy showed a tumor which might be classed as a glioma, but should be considered as coming from a precursor of the glia cell.

Clinical Record

Mrs. E. had her first convulsion when she was twenty, after the birth of her only child. Many convulsions occurred to the time of her death at forty-nine. These attacks are described by her husband as lasting from a few minutes to fourteen days: as often initiated by some startling event such as some one coming suddenly upon her when she was at work: as a stiffening of all the muscles of the body, "so that head and feet would almost touch behind": as a violent shaking of the arms.

At thirty-eight an operation (curettage?) was done; the convulsions after this were not so frequent or so severe. At forty-seven came the menopause and severe headaches. At forty-eight in the spring headaches were more intense: they were better in the summer and grew worse again in September. She worried over financial difficulties. Physicians pronounced the case hysteria. On November first she took to her bed. In November and December, the two months before admission, the following symptoms appeared in the order given: incontinence of urine, vomiting, blindness of one

* A contribution to the William Leonard Worcester Memorial Series of Danvers State Hospital Papers, presented November 19, 1915.

eye, difficulty in speaking, inability to speak, incontinence of feces, paralysis of right arm and the leg. Even this condition was diagnosed as hysteria.

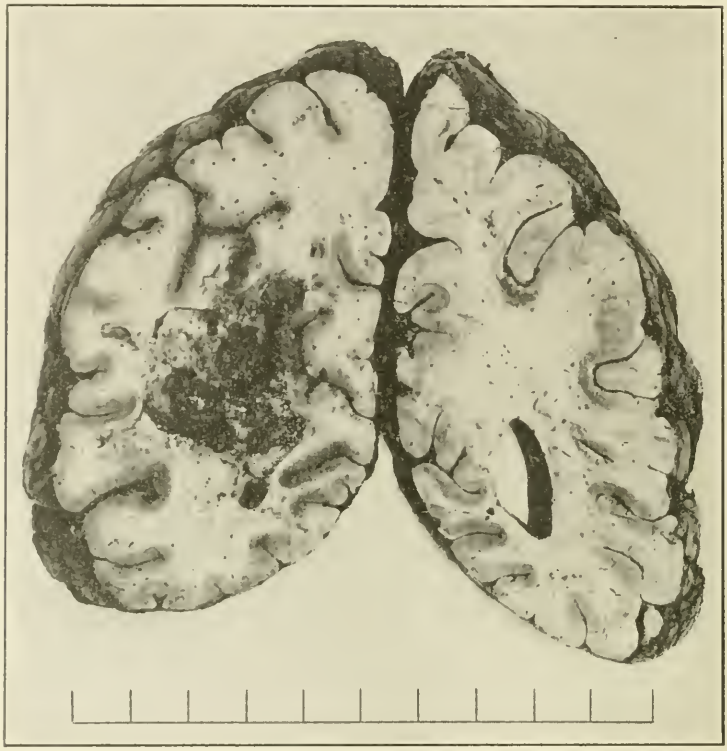

Fig. 1. Location of the tumor mass. Coronal section, occipital lobes.

After admission she lived two and one half months. Her condition throughout this time changed very little. All the symptoms spoken of above in the history were shown. In addition the right arm and leg were very tender to the touch for the first few days, after which they were anesthetic. The left arm showed cerea flexibilitas. The right knee jerk was absent; there was a Babinski sign on the right. The right pupil was larger than the left. The Wassermann on the blood was doubtful and cerebrospinal fluid was negative. The cells were not increased in the latter. The patient at times was able to answer questions. At one time she said that she was "disperik" and "charaterisic" and also said that her tongue was all gone and that she could never get it back.

Description of Tumor

Complete autopsy showed little that was remarkable in the organs of the body. In the brain was found a tumor in the left

parietal and occipital lobes, 6 cm. in length, the other two dimensions being 3 cm. at their greatest. The lesion extended to within 3.25 cm. of the occipital tip. The shape was very irregular and the consistency variable. In one plane of section was an L-shaped mass, dark, hard, sharply defined to finger and eye, movable en masse in the very much softer surrounding tissue. The softer tumor tissue was pink; there was a thin light-yellow cloudy fluid in the central broken-down parts of the lesion. There was no capsule formation, and it was impossible sharply to distinguish the boundary of the new growth. The lesion extended from the roof of the ventricle upwards and to both sides in white matter, never directly invading the cortex (Fig. 1).

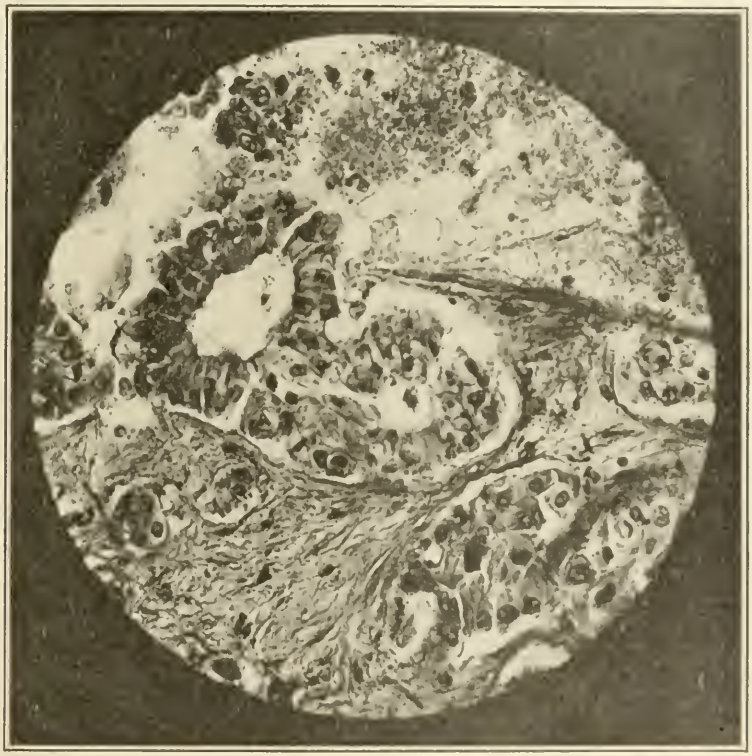

Fig. 2. Photomicrograph of the tumor, to show "rosette" arrangement.

The microscope showed a tumor composed of large cells, with little fibril formation, supported by considerable connective tissue.

The tumor cells were large with much cytoplasm, round, triangular or cylindrical; the nucleus always eccentric. Mitoses, large multinucleated cells, inclusions, and vacuoles were frequent. There were many fields where cells were piled layers deep and apparently independent of stroma, but usually the connective tissue framework

was abundant and strong and the cells presented a striking alveolar arrangement (Fig. 2). Many of the cells in the gland formation had a deep staining free margin, which suggested end plates or cilia.

On approaching the tumor from normal surrounding tissue first a zone of numerous blood vessels was noticed, then groups of apparently isolated tumor cells. Sound tissue was often prolonged into spaces between the gland-like formations.

Detritus and tumor cells were found in the ventricular cavity near the lesion. No sign of proliferation of the ependymal cells in situ was noticed.

Duration

A tumor with the above microscopical characteristics would be considered to have been rapid in its growth. One hardly feels justified in dating it back 29 years to the first convulsion. In reading clinical reports of brain tumor, however, one constantly sees the statement. "this man, aged 30, had epileptic attacks from the age of 20, or headaches from the age of 25," later followed by the assumption that "the tumor had existed for 10 years or 5 years." It is a dangerous habit to place without due consideration the onset of a "first symptom" when that symptom is one belonging also to other diseases.

Cushing remarks that brain tumors are of longer duration than is generally supposed. He gives a case[1] resembling the present one, a woman who for 20 years had suffered from irregular headaches, periods of amenorrhea, intermittent grades of hemianesthesia, and hemianopsia, inversion of color fields, and periods of semi-consciousness. During all this time hysteria was the only diagnosis. A terminal choked disc betrayed the lesion—a benign tumor of the right temporal and uncinate region.

In the case presented in this paper it is more reasonable and more useful to consider the convulsions as symptomatic of the tumor or a lesion on the site of the tumor.

Classification

Closely packed cells with abundant cytoplasm, producing few or no fibrils, arranged in glandlike formation, do not at first thought suggest glioma. But this is a primary brain tumor. It is recognized that even lack of glia fibrils does not necessarily rule out glioma, while an alveolar arrangement is possible though rare. Ribbert[2] shows rosettes in a glioma, and describes epithelial-like

[1] Cushing, in Modern Medicine (Osler and McCrae), 1915, Chap. V, p. 342.

[2] Ribbert, Geschwulstlehre, 1904, Fig. 262, pp. 335–336.

formations in a glioma of the cerebellum. Mallory[3] shows a somewhat similar picture of neuroglia abutting on stroma—remarkable because it is the fibrils and not the cell bodies which produce the effect.

"Gland and cyst-like cavities lined with ependymal cells" "suggest that these particular tumors at least arose from some abnormality of the central canal, such as displacement of a group of ependymal cells in the early embryonic life," says Mallory.[3] In this particular tumor the single-celled linings about a lumen suggest ependyma; the tumor touches the roof of the ventricles. It seems that cells which display characteristics on one side possessed by glia and on the other by ependyma should be referred to the common ancester of glia and ependyma—the undifferentiated cell lining the central canal in the embryo.

[3] Mallory, Principles of Pathologic Histology, 1914, Fig. 268, p. 351.

THE REACTION OF THE PUPIL TO COLORED LIGHT*

By James A. Cutting, A.B., M.D.

ASSISTANT PHYSICIAN, AGNEW STATE HOSPITAL, AGNEW, CALIFORNIA

In making the routine examination of patients admitted to the Agnew State Hospital, I was impressed with the importance of the pupillary reaction in the diagnosis of certain diseases, especially of the nervous system. I wondered if there might not be some finer test for the pupillary reaction than that of flashing a bright light into the pupil. It occurred to me that possibly different colored lights might have a different effect.

This led to the following investigation in order to ascertain:

(1) If colored light caused the same pupillary reaction as white light;

(2) If a certain color produced a specific pupillary response in a particular disease, and

(3) If the use of colored lights were of clinical value.

With the clinical adaptability of the idea particularly in mind, I obtained colored electric-light globes of four, eight, and sixteen candle powers in blue, green, red, yellow and white. The regular examining room was employed with shades drawn and lighted by means of a single sixteen-candle-power white light. Each pupil was tested in turn with the different colors and the different candle powers.

The patients on whom the investigations were conducted consisted, for the most part, of two hundred new cases as admitted to the male department of the Agnew State Hospital over a period of eight months. They included cases of epilepsy, dementia præcox, senile dementia, paranoia, manic-depressive psychosis, hysteria, paresis, morphinism and alcoholism.

I found that white light caused the greatest contraction of the pupil, next came yellow, then red, green, and lastly blue. For instance, the four-candle-power white light gave a much greater reaction than the eight-candle-power blue light. In fact it was hard to grade the different responses to the white light, inasmuch as the lowest candle power white lamp I was able to obtain gave practically the same reaction as did the sixteen-candle-power lamp, but by

* Read before the Stanford Clinical Society, San Francisco, March 5, 1917.

means of a rheostat I managed to reduce a thirty-two-candle-power white light to a quarter of a candle power. This gave much the same reaction as the eight-candle-power green, but in reducing the thirty-two candle power to a quarter candle power, the light was also changed from a white to golden yellow and could no longer be called a white light reflex. By using the rheostat on a three-candle-power globe with a shorter filament the light remained more nearly white and gave a somewhat better reduced light.

In saying an eight-candle-power green or an eight-candle-power red light it must be remembered that in each globe the same length and the same sized filament is used, which with uncolored globes would all give an equal amount of light. The only difference lies in the different colored glass used. I made a special point of getting globes in which the transparency was as nearly equal as possible in all the different colors. I then endeavored to compute the actual candle power of each globe. This, however, led to considerable difficulty, as it was very hard to compare a yellow light from a candle with a green or red electric light. Comparing the shadows cast by two different colors was also very difficult. This led me to wonder what part the intensity of the different colored lights really played and if the absolute purity of the color made any difference in the pupillary response. The only literature I could find on the subject was an article by Myerson and Eversole.[1] These observers noted the reaction of the pupil by using photographic color screens. These screens were probably as pure as could be artificially made, but, as they pointed out, were still not as pure as spectral colors. In the spectrum one gets the only pure colors, and this I determined to try out on the pupil.

By means of a flint glass prism, a convex lens and a narrow beam of sunlight, I cast a spectrum with little overlapping of colors on the wall of a dark room. I then had a patient sit with his back to the wall and with his eyes on the same level as the spectrum. By starting at one end and moving the eye through the different colors it was found that from the ultra red end of the spectrum to the yellow zone the pupil gradually decreased in size, reaching a maximum contraction in the yellow band. From here the pupil gradually increased in size to the ultra violet end of the spectrum, where the pupil reached its maximum size. In other words yellow caused the greatest contraction of the pupil, reddish yellow next, green next, then blue, and lastly violet. This I find corresponds to

[1] A. Myerson and G. E. Eversole, Notes on Sunlight and Flashlight Reactions and on Consensual Amyosis to Blue Light, THE JOURNAL OF NERVOUS AND MENTAL DISEASE, November, 1913, Vol. 40, No. 11.

the luminosity table of the spectral colors as worked out by Vierordt,[2] in which he gives yellow light a luminosity value of 1,000, reddish yellow 780, green 370, red 22, blue 8, and violet 1. This, it seems to me, proves conclusively that the pupil follows in amplitude of reaction the luminosity or stimulating effect of the different colors. White light, being a composite of all the colors, produces the greatest pupillary response. So, when the direct beam of sunlight is flashed on the pupil, it produces a greater contraction than when any one of its components is employed. Yellow light, being the nearest to white light, causes the next greatest response. The results I obtained with the colored light globes corresponded with the results obtained by the use of the pure spectral colors. The red globe had also some admixture of yellow and hence should be classified as a reddish yellow light rather than a pure red. Undoubtedly also the other globes were not composed of pure colors—but as I have said, they answered well the purpose.

As regards any specific reaction to colored lights in different diseases, I could find no evidence. The paretic and the hysteric followed the same order in amplitude of reaction. Blue light produced less of a reaction than the same candle power in yellow, green, red, or white, in all the different diseases. Naturally in a senile patient the pupil did not respond so promptly to any given light as in a younger person, but by flashing a red, green, or blue light, as the case might be, on a pupil I could not differentiate one disease from another by any peculiarity of pupillary response inherent in one color and not in another. An eight-candle-power green light may not cause a reflex in a paretic where a white light reflex is already sluggish simply because the green being a reduced light produces no response.

In three or four cases there was a paradoxical reflex when the green light was used which was not obtained when the stronger white light was employed. The significance of this, if any, must be further investigated.

Lastly, as to the clinical value of the colored lights, I have found a distinct advantage in the use of the eight-candle-power green light as a guide to the degree of sluggishness in a pupil. Particularly in testing the pupil in paresis was this true. Here a pupil was often found which would not react to an eight-candle-power green light, but would react to the ordinary white light. I find that it is much more satisfactory to say a pupil will not respond to an eight-candle-

[2] Earnest H. Starling, Principles of Human Physiology. Lea & Febiger, Philadelphia and New York, 1912, pp. 636.

power green light than to say a pupil is somewhat sluggish to light. Likewise if one were to say a pupil responds actively to an eight-candle-power green light there could be little doubt as to the sensitiveness of the pupil. It gives a much better guide from which to work. The reason for using the green light in preference to the blue is simply that I found the reaction much more easily followed with the green. Red is too dazzling, yellow too nearly like the white, while with a violet light it is extremely hard to follow the contraction of the pupil at all. Green is a better working light. The four candle power, while sometimes of help, really gave so little light that it was hard to follow the reaction well and for all practical purposes the eight candle power was of more use.

As regards the practical use of an eight-candle-power green globe the following case history is of interest:

M., a male patient of thirty-five, admitted to A. S. H., April 28, 1915, Italian. His commitment stated that he was restless, excited and violent. He had thrown articles of furniture about his home. On entering the hospital he was over-talkative, over-active and very distractable. Owing to his foreign accent it was quite impossible to say if there were a slurring of speech or not. Clinically he appeared to be a case of manic-depressive insanity. The neurological examination showed practically normal reflexes except for the pupils. Here the left pupil was found to be inactive to eight-candle-power green light, while the right responded quite promptly to the same light. A lumbar puncture was done: 152 cells per cu. mm. were found and the Wassermann was triple positive.

Thus the different responses of the two pupils to light led to the correct diagnosis of paresis rather than to a wrong diagnosis of manic-depressive insanity.

The mistake must not be made that because both pupils are slow to respond to an eight-candle-power green light the patient is necessarily a paretic. Alcoholics and users of morphine and cocaine often give this same sluggish response, but where one pupil responds and the other does not, we have a very significant sign, and with the green light we may have a very early sign. Yet earlier we may have a difference in the consensual reflex to colored light.

After having satisfied myself of the practical value of the green light, I determined on the following as a routine method of examining the pupil. I have used it in about one thousand cases and find it very satisfactory and convenient. In place of the ordinary one-piece attachment to the electric cord, a double bulb holder is used. In one socket is placed an eight-candle-power green light and in

the other a transparent thirty-two-candle-power white light. Thus in turn the two colors can be conveniently used.

After instructing the patient to gaze at the ceiling the green light is turned on and the size and contour of each pupil noted. The same light is then flashed alternately on each pupil and the degree of contraction noted. Thus the patient is prepared for the thirty-two-candle-power white light, which is next used and better coöperation obtained than by flashing the bright light first. This is especially true of very nervous or suspicious patients. If the pupil is found not to respond to green light the white is used to determine the degree of stiffness.

By always using the same light under the same conditions a better idea of the pupillary response is obtained.

Thus to summarize:

1. The pupil reacts differently to different colored lights, giving a greater reaction in some than in others in the following order: White, yellow, reddish yellow, green, blue and violet, thus following the luminosity of the spectral colors.

2. There is no reaction specific to different diseases—the same law holds for the paretic as for the hysteric.

3. There is a distinct clinical value in using the green light as a "measure" for amplitude of reaction, which cannot be obtained from white light. It is a convenient method for measuring the amount of light necessary to produce a pupillary response.

In conclusion, I wish to thank Dr. Leonard Stocking, medical superintendent of the Agnew State Hospital, for allowing me to conduct this investigation.

CENTRAL ATROPHY*

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Atrophy occurring in muscles the seat of paralysis due to central lesions has been repeatedly observed. Its prevalence is perhaps imperfectly recognized. It is much more frequently present than generally believed and is a symptom not habitually looked for or observed.

In a case reported before the Philadelphia Neurological Society on March 24, 1916, and already published, the atrophy was very marked and was of such unusual origin that I quote it here in some detail (1).

Charles Jordy, aged 24, applied to the Philadelphia Polyclinic Hospital, February 28, 1916.

On examination it was discovered that the leg and to a less degree the arm on the left side were smaller than on the right. This wasting, he stated, followed a gun-shot wound of the cranium in March, 1905.

He was admitted to the University Hospital, and on examination a wound was found over the parietal and motor regions on the right side. The face, arm and leg on the left side were paralyzed and astereognosis was present.

He was operated on a week after admission, the wound was explored, and two or three fragments of bullets and many hairs were removed. Craniotomy was done, and an electrode applied, but without response. The wound was reopened for drainage and two weeks after this it was opened more deeply to permit granulating from the bottom of the wound.

On May 25 he was discharged with some weakness in the left leg and exaggerated patellar reflex, the astereognosis having disappeared. He began to work again in six months, after having been in bed for four months.

On examination at the Philadelphia Polyclinic Hospital on February 28, 1916, it was found that the left arm and leg were distinctly smaller than the right arm and leg. He was able to move the foot at the ankle joint only slightly in flexion and extension. The knee jerks were equal and slightly exaggerated. A left-sided Babinski and Oppenheim were present. On testing his ankle clonus

* Read by title at the Forty-third Annual Meeting of the American Neurological Association, May 21, 22, 23, 1917.

none was obtained, but there followed the test an irregular tremor of the thigh. There was an irregular coarse tremor of the left leg, when the muscles were put on tension. Sensation was normal.

There was observed some wasting of the left side of the face. The left arm was smaller by 1.5 cm. in circumference, and the left leg at the thigh was 6.5 cm. smaller in circumference than the right, and the calf 2.5 cm. smaller.

The gluteal muscles were distinctly wasted. No sensory change to pain, touch, heat or cold; nor astereognosis was present.

The X-ray plates located the bullet in the posterior portion of the middle fossa just a little above the base of the brain on the right side.

In view of the fact that the atrophy followed soon after the original injury, it is fair to assume that the present position of the bullet has nothing to do with the causation of the atrophy and that the atrophy was due to the cortical lesion.

My interest in the subject was aroused by this case and through the kindness of Dr. Spiller I was permitted to study the following cases with pathological findings from the material in the laboratory of the University of Pennsylvania.

Case I. Emma G., age 58, presented left hemiplegia of unknown duration and a right hemiplegia of a few days' duration. It was impossible to obtain any further history on account of the clouded mental condition. The patient, an aged white woman, fairly well nourished and fairly well developed, was paralyzed on both sides. The left arm and leg presented a moderate degree of atrophy. The muscles of both arms and legs were somewhat rigid, especially on the left side. The knee jerks were increased and the Babinski phenomenon was present but there was no ankle clonus.

Each crossed pyramidal and one direct pyramidal tract were degenerated, especially the left crossed pyramidal tract. There was a small area of sclerosis found in each centrum ovale above the internal capsule involving the motor fibers. These areas showed masses of fatty granular cells but no round-cell infiltration.

In the left anterior horn there was considerable change in the cells. Some cells had totally disappeared and some of the remaining ones were swollen and atrophied and had lost their nuclei, and a few were normal.

Case II. Winifred L., aged 61, admitted with left hemiplegia of unknown duration. The face was slightly turned to the right side and the naso-labial fold on the right side was more distinct than on the left. The tongue was protruded slightly to the right. The left arm was paralyzed and spastic and presented beginning flexure contractures. The left leg was held out straight and somewhat rigidly with marked contracture of the Achilles tendon with plantar flexion.. The right leg seemed to be somewhat wasted but there was distinct atrophy of the left leg. The knee jerks were increased and there was positive Babinski on the left.

There was found a moderate degree of round-cell infiltration in the pia in the left paracentral region and in the cortex in this region

there were two more areas evidently of beginning necrosis, as there were compound granular cells present. There was a moderate degree of perivascular distension in the right cortex. In the right foot of the peduncle, corresponding to the second fourth from within outward, there was acute degeneration by the Marchi method. The cord was not studied. This was probably a case of syphilitic disease. No gross lesion was found.

Case III. George S., aged 69, presented left-sided spastic paralysis of seven months' duration with exaggerated reflexes, double Babinski, and some tenderness over the nerve trunks. There was also weakness of the right arm and leg of three months' duration and the reflexes were exaggerated on this side also. Both legs were held in marked flexor contractures. The arm jerks were exaggerated but the leg reflexes could not be elicited on account of the extreme contracture. The arms were edematous from the elbow downward and over the surface of the elbow there were blisters evidently trophic in origin. There was an area of local gangrene on the heel of the right foot. There was some atrophy of the muscles of the hands including the interossei on the left side. He complained of sharp shooting pains in the limbs especially the lower ones.

There was slight infiltration of the paracentral lobule and thickening of the blood vessels and slight perivascular round-cell infiltration of the cortex here as well as in the perivascular and occipital regions. An area of softening on one side of the pons was found and the pia over the pons was the seat of round-cell infiltration and the vessels were thickened. The pyramidal fibers on one side of the medulla stained less deeply than on the other. In the cervical region of the cord the crossed pyramidal and direct pyramidal tracts showed degeneration on both sides by the Marchi and Weigert methods. The pia of the cord in this region also showed round-cell infiltration to a moderate degree. In the lumbar region the crossed pyramidal tracts were slightly degenerated, the pia infiltrated with round cells, and there was a mild degree of perivascular infiltration within the cord. No gross lesion.

Case IV. Samuel M., aged 54, presented a left hemiplegia of three years' duration and a second attack of two months' duration on the same side. There was slight paralysis on the left side. The left arm was held in a flexed position across the chest and movements caused pain. The muscles of the arm were markedly atrophied. Temperature sense was impaired but touch sense was not implicated. There was lowered power in the leg muscles and muscles of the leg showed some wasting. The right side was normal. The reflexes were increased on both sides. Babinski phenomenon was present on the right and ankle clonus was absent on both sides.

There was an extensive area of softening in the right basal ganglia. The middle cerebellar artery was occluded. There was no degeneration of the pyramidal tracts by the Weigert method, but intense degeneration was observed by the Marchi method on one side. There was round-cell infiltration of the pia of the paracentral

region on the left side and some perivascular round-cell infiltration of the cortex on the right side.

The anterior horn cells in the cervical region showed a moderate degree of yellow pigment change but otherwise the cells were not diseased. In the thoracic region there was a distinct change in the cells. The nuclei had disappeared, many were displaced, the cells were swollen, though a number of them were not altered. A similar change was found in the lumbar region.

Case V. Susan W., aged 66, had left hemiplegia of unknown duration. There was marked spastic paralysis of the left arm. When an effort was made to move the arm at the shoulder it appeared to be painful. There was considerable atrophy of the left arm muscles. There was lowered power in both legs and some atrophy present on both sides. The reflexes were increased on both sides but more on the left and there was a positive bilateral Babinski.

There was a linear scar in the left occipital lobe cutting the optic radiations. The right and left lenticular nuclei appeared to be softened. The right lenticular nucleus contained areas of rarification, with some fatty and granular cells present. The anterior pyramidal tracts stained well. The cord was not obtained.

Case VI. Kate W., aged 63, presented a right-sided hemiplegia of five months' duration. There had been a similar attack a month previous on the left side. The tongue, pushed to the right, was not atrophied. There was flaccid paralysis of the right arm with contraction in the extension of the fingers except the little finger which was contractured in flexion. The muscles of the forearm were flattened out and there was wasting of the thenar and hypothenar muscles. The right leg was flaccid, the foot being held in a position of foot drop.

At the autopsy there was found a minute cavity sharply confined to near the center of the outer part of the left lenticular nucleus. There was a focus of hemorrhagic encephalitis of the left occipital lobe almost confined to the upper cortex just below the calcarine fissure. There was a minute old scar in the right optic thalamus which explains the weakness in the right upper extremity. There was an old cyst which cut the uppermost fibers as they form the left internal capsule. The cord was not studied.

Case VII. Dora K., age unknown, had a right hemiplegia of unknown duration. There was wasting of the tongue around the tip and it could not be protruded beyond the border of the lips. There was some wasting of the right arm and there was marked fixation at the shoulder joint. The right arm was flexed at the elbow, the hand flexed upon the forearm and the whole arm tightly adducted. The right leg was the seat of contractures and presented no atrophies.

A sclerotic area had destroyed the left upper portion of the left optic thalamus and half of the posterior lobe of the left internal capsule. The lenticular nucleus was involved only in the extreme posterior portion and then very slightly. The carrefour sensetif was destroyed and the optic radiations cut. There was a very small

area of sclerosis in the right optic thalamus. There was intense degeneration of both crossed pyramidal tracts more on the right. This degeneration was pronounced in the cervical and slight in the lumbar regions.

The anterior horn cells in the cervical region and the lumbar region showed a moderate degree of change. While there were many healthy cells, many showed yellow pigment change in a pronounced degree in the thoracic region.

Summary of Pathological Findings

In the first case there was a bilateral lesion of the centrum ovale, degeneration of the pyramidal tract, and change in the anterior horns in the cervical region.

In the second and third cases there were specific encephalitis and meningitis.

In the fourth case there was an area of softening in the basal ganglia and change in the anterior horn cells in the cervical region.

In the fifth case there was a focus in the left optic lobe and the lenticular nuclei were implicated.

In the sixth case the left lenticular nucleus was involved, and there were encephalitis of the left occipital lobe, a focus in the right optic thalamus and one in the internal capsule.

In the seventh case, there was a destructive lesion of both optic thalami, the internal capsule, the lenticular nuclei, and the carrefour sensetif. The anterior horns were degenerated.

If any conclusion may be justified from a small number of cases it would be to support the view that atrophy is caused by lesion of the basal ganglia, as well as of the cortical regions.

A series of thirty-eight cases was also studied in the wards of the Philadelphia General Hospital, for the privilege of which I am indebted to Drs. Potts, Weisenberg and McCarthy, who kindly placed their material at my disposal. The patients were hemiplegics, left and right about equally divided, of an age ranging from 28 to 81 years.

Observation was made for atrophy of the face, tongue, shoulders, arms, hands and legs. The duration of the paralysis was from 17 days to 9½ years. There were four cases of two months' duration, one of ten months' duration, and one of ten weeks' duration, but most of them were from one to several years' duration.

Of 38 cases, 7 showed some atrophy in the muscles of the face. The muscles implicated were those about the mouth and of the cheek adjoining the mouth. It was slight in most cases but pronounced in some and in all cases some palsy of the muscles show-

ing the atrophy persisted. The tongue showed no atrophy in any case.

The deltoid was more or less wasted in 32 cases. The posterior part of the deltoid was the favorite seat of the atrophy, where it was most pronounced, though the anterior and lateral portions were also affected.

The supra- and infra-spinati group were involved in 28 cases.

The biceps and triceps showed wasting in 19 cases, the circumference of the paralyzed side varying from 1.2 cm. to 6 cm., averaging 2 to 3 cm.

The forearm was the seat of wasting in 29 cases.

The small hand muscles were involved in 25 cases, that is the thenar and hypothenar eminences, some to a moderate degree, some extensively and the interossei muscles were wasted in 20 of these.

The leg showed atrophy in 18 instances, involving the gluteal and thigh muscles and in the calf more particularly the anterior muscle group.

There was no evidence of neuritis in any of these cases, notwithstanding the fact that in two cases there was general tenderness of the limbs, and in spite also of the fact that in eleven of the cases pain in the paralyzed limbs was present. This was independent of joint changes or contractures, in fact was spontaneous pain.

The joints showed no change except in the finger joints. While the movements at the shoulder joint and elbows were in all instances more or less restricted by reason of contractures of the muscles, no change in the bones of the joint could be recognized and no fixation was demonstrated except in two cases where the shoulder joint showed some slight change, and relaxation.

On the contrary in the finger joints and the wrist joint some fixation had occurred in seven cases. The fingers were tapering in these cases, the joint fixed, the skin shiny and the condition presented an appearance suggesting the trophic changes observed in neuritis.

While disuse may explain some of the wasting in these cases, it plays but a minor part.

There is a general disuse of both sides in those chair and bed patients who practically are motionless day in and day out, and yet there is atrophy to a pronounced degree on the palsied side. If the wasting were alone due to disuse one would expect little or no difference in the two sides.

Against this view also is the fact that in one case in which there was total paralysis with marked contractures it was impossible to

discover any atrophy in any of the muscles except the posterior deltoid and the forearm. Only in two of the cases was the atrophy so slight as to be negligible including this case.

Atrophy appearing in the paralyzed limbs in cases of hemiplegia of central origin has been attributed to cortical changes, lesions of the optic thalamus, lesions of the caudate nucleus, of the corona radiata, centrum ovale, corpus callosum, the internal capsule, the pons and to leptomeningitis. Lesions of the anterior horns have been assigned as the cause of the atrophy in a certain number of cases. It has been demonstrated also that peripheral neuritis is one of the causes and finally atrophic changes in the muscles due to joint disease, being of the nature of an arthritic atrophy, have been described.

Many instances of cortical lesion have been reported.

Gliky (2) described a glioma of the central convolution, the third frontal, the supermarginal and operculum. Buressi (3) described tubercles in the right anterior lobe, the pons, the medulla oblongata, and with atrophy of the anterior horns. Brissaud (4) later described an area of softening in the fissure of Rolando, in the anterior and posterior part of the marginal convolution and a second case with softening at the foot of the frontal convolution, the middle frontal and superior parietal convolution. There was involvement also of the nerves which showed atrophic change. Quincke (5) in 1888 cited two cases of glioma, one in the right central convolution and paracentral, and the other in the anterior central convolution. Eisenlohr's (6) case was one of abscess of the anterior left central convolution with negative spinal cord. Kramer (7) described a case of leptomeningitis involving the frontal lobe, operculum, gyrus marginalis, and angularis. In Borgherini's (8) case there was a sarcoma of the left central convolution. Senator's (9) case was one of abscess in the left frontal lobe. Petrini (10) cited a case of glioma of the right posterior central convolution. Muratow (11) described a case of atrophy of the frontal and anterior central convolutions, gyrus fornicatus, and callosa marginalis, also implicating the optic thalamus and corpus callosum. There was an involvement also of the cells in the anterior horns which showed marked atrophy. Roth and Muratow (12) cited a case of glio-sarcoma of the right central convolution.

The central ganglion is the seat of lesions in a number of cases, for example, Eisenlohr's case showed the posterior part involved. In Anton's (13) case the posterior part of the optic thalamus was involved. In Jakob's (14) case the optic thalamus and the corpora

quadrigemina. In Klippel's (15) case the optic thalamus and the lenticular nuclei were the seats of lesions. Muratow's case involved not only the optic thalamus but also the frontal and anterior central convolutions and the occipital convolutions. The caudate nucleus was the seat of the lesion in the cases reported by Kirchhoff (16), Monakow and Eisenlohr. The corona radiata was involved in Darkschewisch's (17) case. The centrum ovale was involved in the cases of Charcot (18) and Babinski (19). The pons was involved in Markelowitch's (20) case, the corpus callosum in Steinert's (21) case and the internal capsule in the case of Darkschewisch (22).

Anterior horn changes were described first by Charcot (23) in 1887. Later Brissaud, Babinski, Kirchhoff, Margulies (24), and Dejerine (25) described similar changes. Joffroy (26) and Archard described anterior horn changes and sclerosis of the nerves. They believed that in the majority of cases there was a dynamic irritation in the motor cells analogous to the changes found in peripheral lesion occurring after amputation, such as those described by Marinesco. Margulies found atrophy of the cells of the anterior horns which he attributed to the loss of dynamic action of the interrupted central neuron and the nutrition and function of the cells of the anterior horns.

Peripheral neuritis was first described by Dejerine (27) in 1889, who found in four cases in which the spinal cord was negative altered nerves in the thenar region. Brissaud found atrophied nerves with fatty granulations of the transverse striations and multiplication of the embryo-plastic nuclei between the primary fibers.

Muscle changes were described by Löwenthal (28). The nuclei were round and moderately numerous and many fibers were thickened and polygonal and the nuclei were in rows.

Joint changes were described by Darkschewisch who found diseased joints in six of nine cases. Gilles de la Tourette (29) found arthritis change in ten of twenty cases. Steinert found in seventeen cases muscle changes consisting of thickening of the muscle fiber and increase in the nuclei. There was nothing found in the peripheral nerves. In a later case there was a moderate atrophy of the nerves of the affected side.

Experimental work adds some data. Lewy (30) experimented upon apes, causing atrophy in the paralyzed muscles of cerebral and spinal origin. In the atrophic muscles there was no change in the transverse striations and the muscles were really free from degenerative processes.

Caracciolo (31) experimented on eleven dogs, removing portions of the brain, and explained the atrophy which followed on the basis of the propagation of the cerebral lesions to the cells of the anterior horns by way of the descending fibers which degenerated.

The atrophy appears to be late usually according to Borgherini but in one case which he reported it occurred in seven days; in Gliky's case the paralysis was of sixty-three days' duration; in Burassi's case twenty-four days; in Patella's (32) case two months' duration; in Quincke's two cases four and five days' duration. Margulies says that the duration is usually two months while Leri stated that it may occur at the end of the first week but usually is an old manifestation. In Kirchhoff's case it was of four months' duration.

Central pain and atrophy may be associated as in the case of Brissaud and Kirchhoff, and in my own cases.

It may be concluded from this study that (1) cortical lesions give rise to atrophy in the paralyzed muscles, which is independent of spinal cord changes as in the cases described by Eisenlohr and others.

It may further be stated that in a number of cases there are associated changes in the anterior horn cells which may be looked upon as secondary to the cortical lesion. (3) Some cases of hemiplegia show little atrophic change even when the palsy is pronounced. (4) Neuritis plays some part in the causation of trophic muscle changes found in central lesions. (5) Disuse plays a minor rôle in the causation of the atrophy. (6) Arthritic atrophy does not often occur. (7) Atrophy in paralyzed muscles of central origin is common and its absence unusual.

The shoulder muscles, especially the posterior part of the deltoid, show the atrophy most usually and in greater degree than the other muscles. All the arm and forearm muscles are usually involved and the small hand muscles are almost always implicated.

The legs show the atrophy to a less degree than the arm muscles.

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LESIONS OF THE FRONTAL LOBE SIMULATING CEREBELLAR INVOLVEMENT. DIFFERENTIAL DIAGNOSIS[1]

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In the Atlas d'Anatomie Pathologique of 1829 by Cruveilhier, is reported the first case of cerebellar disorder following a cerebral lesion. It was a case of an idiot who died at the age of five. At autopsy was found a large serous collection compressing the left cerebral hemisphere; the left thalamus was atrophied. The right cerebellar hemisphere was smaller than the left. The next similar record was by Charcot and Turner (in 1856) who explained the crossed character of the lesions by the existence of cerebro-cerebellar fasciculi which form the middle layer of the crura, are crossed in the upper portion of the pons and one portion of them joins the cerebellum. In 1868 Cotard reported a large number of cases of infantile hemiplegia, and in all except four, such lesions were found. In 1895 von Monakow, in 1896 v. de Jong, in 1901 Mott and Tredgold, in 1902 Launois and Paviot, in 1904 Reitsema, Marchand in 1905, in 1909 Mingazzini, in 1907 Marchand; Lhermitte and Klarfeld in 1911,[2] in 1912 Kononova—all reported cases with post-mortem findings showing cerebral lesions with crossed cerebellar atrophy. In the majority of these cases the parietal lobe appears to be the most involved, although in some of them an involvement of an entire cerebral hemisphere is mentioned, particularly in the cases of infantile hemiplegia of the imbeciles and idiots.

There is another series of cases in the literature with direct foci in the cerebrum, but without material lesions in the cerebellum, and with symptoms referable to the latter. L. Bruns[3] reports 4 cases of frontal tumors giving during life cerebellar symptoms. In Bernhardt's book on Hirngeschwülste we find reference to 40 per cent. of frontal tumors with ataxia resembling that of cerebellar diseases and in 12 per cent. of cases a similar condition was observed in tumors of other regions than frontal. In Oppenheim's series of 11

[1] Read at the Forty-third Annual Meeting of the American Neurological Association, May 21, 22, 23, 1917.

[2] Rev. Neur., 2° semestre, p. 73.

[3] Deutsche medizinische Wochenschrift, V, xviii, 1892, p. 138.

cases with frontal tumors nine presented strictly cerebellar ataxia.[4] O. Fragnito has recently reported an important case of tumor in the right frontal lobe which developed as a clinical picture of the cerebellar syndrome.[5] In F. Tilney's case there was a cyst of the frontal lobe of the brain with direct posterior fossa symptoms.[6] H. Climenko, commenting on Tilney's case refers to one of his own series, in which there was found a frontal tumor and the entire medulla and cerebellum were jammed into the foramen magnum. This, he says, explains the distal symptoms.

The following cases fell under the writer's observation.

Case I. Mrs. M. S., aged 41, born in Galicia, complained for a long time of headache and rigidity of the neck. On admission to the hospital the following condition was found. She holds her neck stiff and head to the left with chin elevated and turned to the right. An attempt to rectify the position of the head causes pain. The gait is hesitating with a tendency to fall to the right. Romberg's sign is very marked. She is unable to stand on either foot. Left knee-jerk is absent, right is slight. No toe phenomenon or ankle-clonus. The grip of the left hand is weaker than that of the right. The raising of the left arm is not as prompt and complete as that of the right. There is a distinct ataxia in the left hand as seen from the finger-to-nose movements and from the pointing test. The latter consisted of the following method. After the patient had fixed in her eyes the position of an object placed in front of her, she attempted with closed eyes to touch it with her index—right and left. The left index always pointed externally to the object while the pointing with the right index was invariably correct.

The face was slightly deviated to the right and on wrinkling the forehead there was a distinct smoothness of the skin on the left when compared with the folds on the right side. Tongue protruded slightly towards the left.

Sensations to touch, temperature and to pin prick were distinctly diminished on the left side of the face. *Eyes.* The right internal rectus and left external rectus were paretic. The left pupil reacted poorly to light. Choked disc with small retina was seen in the right eye. A lesser edema and optic neuritis were found in the left eye.

Autopsy Findings.—The right hemisphere is flattened in its anterior third, in the center of which is seen a deep depression. On section is seen a large anteroposterior cavity and a smaller one in the tip of the anterior portion of the frontal lobe. They are filled with a yellowish gelatinous substance. The larger cavity extends to the periphery of the brain, from which it is separated by a thin layer of the cortex. The floor of this cavity is covered with a thick membrane. The surrounding cerebral tissue is totally destroyed so

[4] Archiv für Psychiatrie, Bd. 21, p. 22.
[5] Il Policlinico (sez. medico), XXI, f. 6, p. 245, 1914.
[6] Journal of Nervous and Mental Disease, October, 1916, p. 356.

that the anterior portion of the caudate nucleus as well as the anterior portion of the internal capsule are entirely wanting. Other portions of the vicinity are displaced and deformed. The cavity reaches upwards, the cortex thus rendering it very thin. In the very

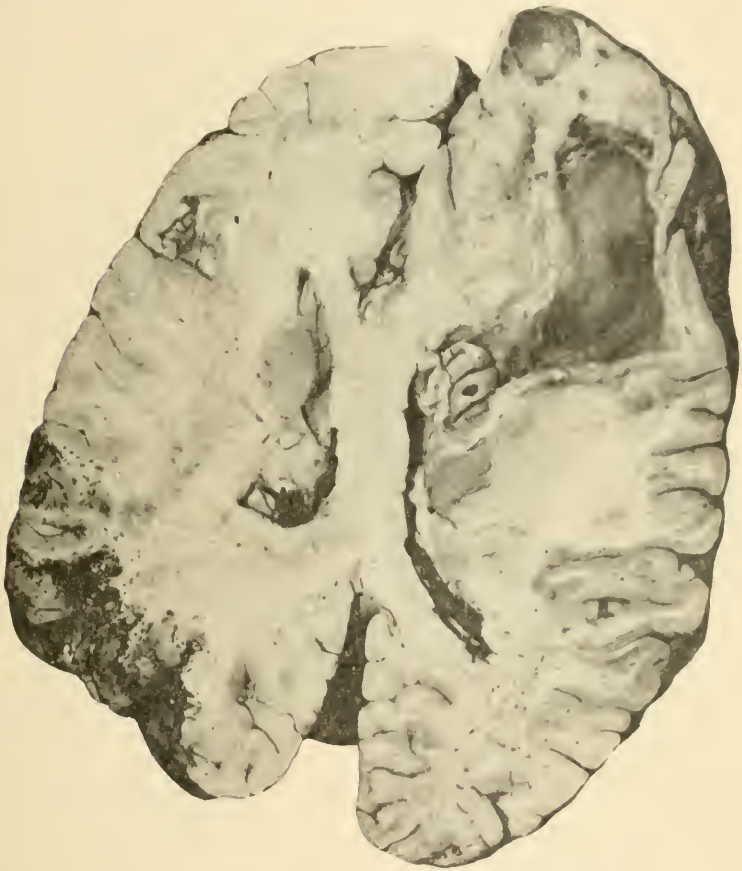

FIG. 1. Case 1. Cystic cavities in the frontal lobe.

posterior portion of the cavity is seen an isolated cystic formation filled with the same fluid as the larger one and the anterior small cavities. The rest of the brain and the cerebellum present no abnormalities.

CASE II. Boy of 16 suffered for several months from headache, vomiting and gradual loss of sight. His gait became ataxic with a tendency to walk towards the left side. Asynergia was present and distinct: the trunk did not follow the forward projection of the legs and if not supported he would fall backward and to the left. The knee-jerks and Achilles tendon reflexes were abolished on both sides. Babinski sign was present on the right and doubtful on the

left. The paradoxical sign was present on both sides. The grip of both hands was equal and normal. The face was slightly deviated to the left. Sensations to touch, pain and temperature were slightly diminished on the entire right side. No astereognosis and no other disturbance of the deep sensibilities. The hearing on the

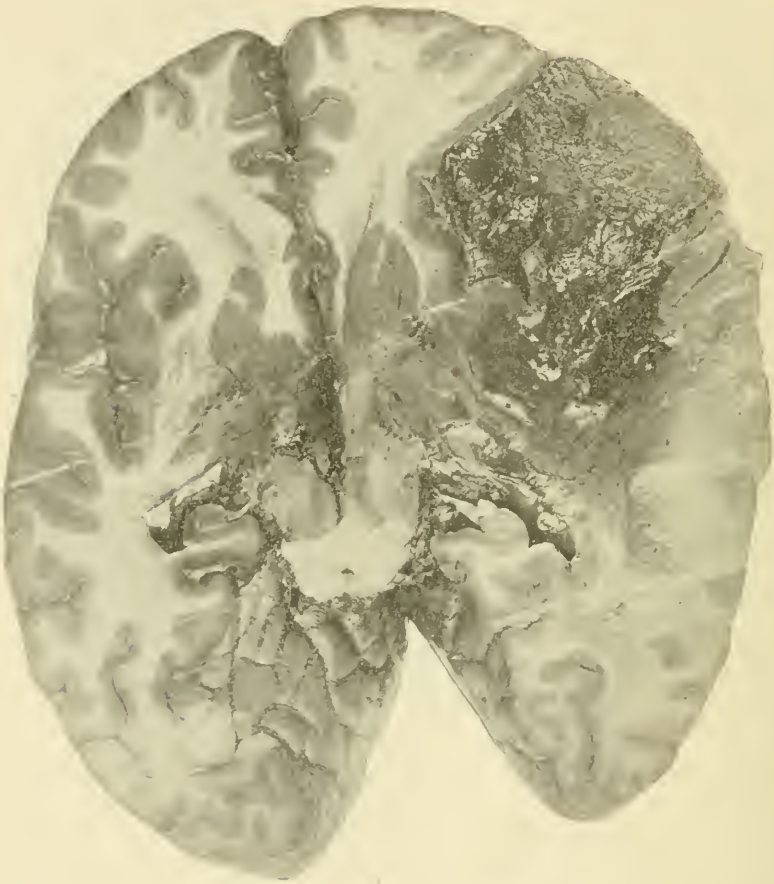

Fig. 2. Case 2. Round cell sarcoma wedged in between the left frontal lobe, insula and temporal lobe, penetrating the lateral ventricle.

right side was markedly deficient. The speech was slow but distinct as to the pronunciation. The eyes presented a very high degree of bilateral papillitis, complete paralysis of accommodation and partial paralysis of the extrinsic muscles of both eyes. The patient was somnolent, dull mentally, easily fatigued upon the least exertion.

An autopsy revealed a large round-cell sarcomatous tumor wedged in between the frontal lobe and the insula of the left hemisphere compressing, displacing and destroying largely the surround-

ing tissue. The frontal portion of the brain was very much reduced in size. The temporal lobe was softened and enlarged.

Fig. 3. Case 3. Abscess in right frontal lobe.

Case III. Girl of 16 after presenting symptoms of influenza soon showed evidences of a right frontal sinusitis and intracranial pressure. Headache, rigidity of the neck; head thrown back, difficulty of turning the head to the left side; a slight paretic condition of the left arm and leg; ataxia and dysmetria of the left arm in a most pronounced form; hypermetria particularly noticeable in the finger-to-nose movements when the finger would overstep its destination and strike either the forehead or the other cheek; adiadochokinesia was present. The left knee-jerk could not be obtained although the toe-phenomenon was present. The eyegrounds showed an engorgement of the veins.

At autopsy the right frontal lobe was involved by thickened meninges and an encapsulated abscess.

Case IV. A man of 35 years after a slight fall, striking his head against a wall began to complain of frequent attacks of dizziness lasting from 2 to 10 hours. At that time he showed a tendency to sleep. In the intervals he was extremely euphoric, happy and

very jocose. At examination he showed Romberg sign with a tendency to fall to the left side. The gait was ataxic and he walked towards the left. The power of the right arm was diminished and the arm was ataxic in the finger-to-nose movements. The knee-

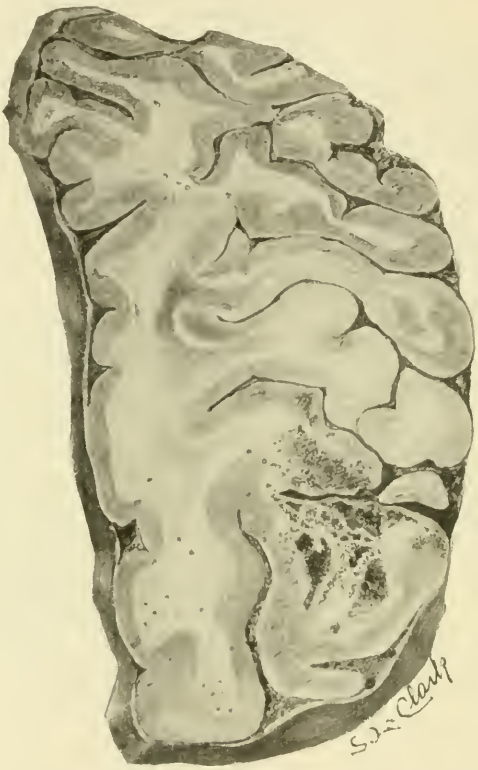

Fig. 4. Case 4. Hemorrhage on the surface of the frontal lobe.

jerks were both diminished and at times unobtainable, less marked on the left than on the right. There was no other abnormal reflex. The eyes were normal. The patient lived three months and died from pneumonia. At autopsy multiple hemorrhages were found in the right frontal lobe.

From the brief description of the four cases it is evident that at first glance a cerebellar diagnosis would have been justifiable in every one of the cases. Briefly, the symptoms pointing to a cerebellar disease in the four cases are as follows. In the first case we have fixed position of the head to the left; gait with a tendency to fall to the right; absence of the left knee-jerk; ataxia of the left hand and the inaccurate pointing. In the second case ataxic gait with

tendency to walk to left side; asynergia; loss of knee-jerks and of Achilles tendon reflex with the presence of Babinski sign; slight right facial palsy; defective hearing on right. In the third case head drawn backwards; difficulty of turning it to the left; ataxia and dysmetria of the left arm very marked; loss of left knee-jerk with presence of Babinski sign. In the fourth case we find: a tendency to fall to the left; ataxic gait; right arm ataxic; left knee-jerk greatly diminished.

It is manifest that there were sufficient evidences for a presumption in favor of cerebellar involvement in all the four cases. Moreover in the first case there were also positive findings in the test for voluntary and passive movements which will be discussed later. Despite all these special characteristic features a definite cerebellar diagnosis could be accepted not without considerable hesitation. As the proper evaluation of all the manifestations was of great importance from the standpoint of the differential diagnosis, the following detailed investigation was undertaken.

First of all, the irregularity in the localization of the morbid symptoms. The unilateral sway in walking or standing is usually towards the side of the lesion. Ataxia of an upper or a lower extremity which is usually tested with the finger-to-nose movement for the upper extremity and by placing the heel of one foot on various parts of the other limb for the lower extremity is ordinarily observed on the side of the lesion. Dysmetria (hypo- or hypermetria) which can be observed in the just mentioned test for upper or lower extremity—is also, if present, usually found on the side of the lesion. The position of the head is in the majority of cerebellar cases found on the side of the lesion. As to the reflexes, the knee-jerk is mostly abolished or diminished on the side of the lesion.

This group of symptoms in its entirety, or at least the majority of them—are found coexisting on one side and are usually pathognomonic of a cerebellar lesion on the same side. In analyzing the cerebellar phenomena in the four cases we find that in cases I, II and IV there was no combination of symptoms all localized on one side. On the contrary they were all *dissociated* and to a degree that if a cerebellar involvement were entertained, its definite localization would have been of great difficulty if not impossible. In case III only two of the above mentioned cerebellar symptoms were present but the accompanying cerebral manifestations were of such a predominance that the few cerebellar phenomena could not lead to any confusion in the diagnosis. In the three other cases however the above mentioned irregularity of distribution of the symp-

toms was taken special notice of. In order to throw more light in the diagnostic effort the following investigation was made in the field of other manifestations which may be considered characteristic of cerebellar lesions.

Holmes and Steward and especially André Thomas called attention to abnormal voluntary and passive movements in cases of cerebellar diseases. According to the first writer, in a unilateral involvement of the cerebellum while the patient is flexing his arm on the affected side and the examiner opposes this flexion with his hand and then suddenly removes the latter, the movement of the flexion continues and the hand strikes violently the chest (which shows a delay in the movement of the antagonistic muscles). In normal conditions, the arm will continue for a moment flexing at first, but will immediately stop and move in the opposite direction. In every one of the four cases this "resistance" test was wanting. In passive movements in cerebellar cases André Thomas called attention[7] to the following phenomenon. When the arm is raised to a horizontal position and the forearm is given repeated abrupt movements, the arm on the side of the cerebellar lesion will show very little resistance, the movements of flexion followed by movements of return (extension) are both of greater amplitude than on the normal side where resistance is greater and the movements are slower. Similarly when both elbows are held and are alternately adducted and abducted, the resistance is less marked on the affected than on the sound side. In the lower extremities if the thighs are placed at a right angle to the pelvis and the legs are extended but immediately abandoned, the leg on the affected side will show less resistance and its return to the hanging position will be more rapid than that of its fellow on the sound side. The same is observed in the movements of abduction and adduction. When the thighs are flexed on the pelvis and the legs on the thighs and alternate movements of abduction and adduction are carried out, less resistance is observed in the leg of the affected than on the sound side. This according to Thomas is more marked in the abductors than in the adductors.

Both abnormal voluntary and passive movements characteristic of cerebellar lesions were totally absent in any of my cases. This fact tends to show that absence of disturbance in the action of antagonistic muscles so characteristic in the diseases of the cerebellum eliminates the consideration of such a disorder in my cases. In further analysis I find that in voluntary movements of cerebel-

[7] Revue Neurologique, 1914, 2e s., p. 111.

lar cases there is usually a certain delay in execution of the act by the limb on the side of the lesion. While a similar condition may be encountered in hemiplegia, nevertheless it never reaches the degree observed in cerebral lesions. Besides, in cerebellar conditions the delay is more marked in acts executed to order than in spontaneous acts. Such a delay is particularly observed in diadochokinesia (Babinski) when the slower alternate movements of pronation and supination are due to the slowness of each individual movement. In the first and only case of my series, the left arm was actually weaker than the right and it presented to all appearances the characteristic adiadochokinesia and more delay in execution of voluntary than of spontaneous acts. On the other hand, when the patient's right hand was held by the examiner's left hand and his left hand by the examiner's right hand and thus rapid passive movements of pronation and supination were produced, equal resistance of the pronators and supinators was observed in both hands, contrary to what Thomas observed in unilateral cerebellar diseases, namely a lesser resistance on the side of the lesion. The same author also calls attention to another cerebellar phenomenon. When the patient being in dorsal position, the leg on the side of the lesion is in outward rotation and then placed in inward position, the foot promptly turns outward. On the other hand when the foot is forcibly rotated externally and abandoned, it returns to its former position less rapidly and less completely than the opposite leg. When the patient is told to raise his arm (of the affected side) and to let it fall on his head, it will do so like an inert body, namely it will rebound several times. This "spring-like" phenomenon may also be observed in voluntary movements such as in the test for dysmetria. In the finger-to-nose movement not only the finger oversteps the point of destination, but when it returns to its former place it also overreaches the latter, particularly when the movements are rapid.

In the first of my cases there were more cerebellar manifestations than in the others, but in spite of them the above mentioned dissociation in the distribution of the few symptoms and the absence of the typical phenomena in the voluntary and passive movements had to be taken into consideration as an important negative element in the differential diagnosis.

André Thomas also called attention to the following characteristics of the tendon reflexes. When the patient is placed on an elevated seat with his legs hanging, without touching the floor, and the test is made for the patellar tendon reflex, the normal knee-jerk will consist

of a sudden extension of the leg and slow return to the position of rest. On the diseased side, if the reflex is present, the movement of extension is of a somewhat greater amplitude and is followed by a series of flexion and extension movements. This reflex is called by Thomas, "the pendulous type." The same form of reflex is observed in the biceps and triceps for the upper extremity in unilateral cerebellar lesions.

These abnormal reflex phenomena, as well as the abnormal passive and voluntary movements—are all indicative of a disorder in the display of the antagonistic muscles and if present, are localized together with other unilateral cerebellar symptoms on the side of the lesion. According to Thomas they are all pathognomonic. If they are characteristic of cerebellar diseases, they were all absent in every one of my four cases.

In pursuing the further analysis of the symptoms for a differential diagnosis, attention is called to muscular weakness which may be observed in both cerebral and cerebellar conditions. In cases I and III there was a slight paretic condition of one upper extremity. The differentiation is especially evident in the test for dysmetria. When the latter is of cerebellar origin, it follows usually abrupt or rapid movements. In cases of hemiparesis of cerebral nature, certain movements are exaggerated. Thus in grasping or releasing an object, the fingers place themselves in hyper-extension and abduction, but what is characteristic is the marked slowness and decided weakness of the movement. In the cases I and III in which a paretic condition of one arm existed, the latter presented the characteristics of a cerebral paresis.

The symptoms already analyzed appear to be sufficient for the purpose of determining whether the lesions in my cases were of cerebral or cerebellar origin. Let us now see whether the remaining signs have any bearing on the differential diagnosis. An ataxic gait was present in three cases. L. Bruns[8] believes that ataxia is met with in cerebral and cerebellar cases, but much earlier in the latter. This statement is corroborated by my three cases as in them the ataxia developed in a later phase of the disorder. As another differential symptom Bruns speaks of choked disc being a very early symptom in cerebellar diseases, while in frontal lobe diseases it is either absent or late. In two of my cases immobile pupils were present, but it was impossible to determine the date of their appearance. The last of my cases presented a special mental symptom which Jastrowitz and Oppenheim called "Witzelsucht," con-

[8] Loc. cit.

sisting of a jocose mannerism. These authors believed it to be pathognomonic of a disorder in the frontal lobe. Other writers, and among them Ziehen, do not consider it characteristic, as they met this symptom also in tumors of other areas of the brain.

Conclusions

In the analysis of the four anatomo-clinical cases we find two series of symptoms: *cerebral* and *cerebellar*. We have seen that in every one of them the diagnosis of a cerebellar disease had to be considered. In case I the number of cerebellar symptoms was such that the presumption was in favor of a cerebellar involvement was quite strong. There were in the four cases ataxia in one of the upper and lower extremities; dysmetria (hypo- or hypermetria); adiadochokinesia; ataxic gait with a tendency to walk or fall to one side; unilateral change of tendon reflexes. These symptoms are all distinctly cerebellar, but was there sufficient justification in considering them as dependent exclusively on a cerebellar lesion? As to the ataxia of gait and station, it is commonly considered as a cerebellar symptom. Nevertheless there are a number of cases on record in which ataxia was found in lesions of the cerebrum and especially in its frontal portion. Moeli laid especial emphasis on disturbance of equilibrium in frontal lobe tumors.[9] To Wernicke ataxia in tumors of the frontal lobe is not only a pathognomonic but also a focal symptom. This is also the opinion of M. Duret[10] who considers frontal ataxia as a reliable localizing sign. Wernicke and Munck, as well as Horsley and Schäffer, place the center for trunk muscles in the frontal lobe. Meynert and Munck explain thus the great development of the frontal lobe in anthropoids and man in relation to the upright gait. This is also the opinion of Ziehen.[11] Bruns, however, believes that in frontal lobe cases there is no true ataxia, but a paresis of the trunk muscles and sometimes also of the head and neck which disturbs the gait and interferes with the proper maintenance of equilibrium. The ataxia observed in cerebral (frontal) and cerebellar lesions cannot always be discriminated. In Hitzig's case, for example, the resemblance was such that the diagnosis of cerebellar tumor was made, the patient was operated upon in the occipital region, but in reality the tumor was situated in the frontal lobe.[12] Similar difficulty in differentiation can be

[9] Charité-Annalen, Bd. 8, s. 540.
[10] Tumeurs de l'Encéphale.
[11] Loc. cit.
[12] Therapeut. Wochens., 1896.

seen from the records of M. Labbé,[13] also from the observations of Lépine,[14] of Eiselberg, Patel, Mayet and Ballet (see Duret). If ataxia is to be considered a symptom of frontal lobe lesions it is essentially a disturbance of equilibrium in station and gait. We do not find here the zigzag movements and titubation which are usually observed in cerebellar lesions. In the cases I, II and IV of my series there was considerable disturbance of equilibrium in station and gait, so that the latter presented a conspicuous part in the clinical picture. Attention was, therefore, fixed upon the apparatus of equilibrium and especially on the cerebellum. But on closer examination the characteristic cerebellar gait was found to be entirely wanting. The gait and station here were merely resembling those encountered in cerebellar cases; the clinical picture was lacking in its totality.

In considering the ataxia of the upper extremities we must bear in mind the possibility of a certain amount of paresis in a limb in both cerebral and cerebellar conditions. In such cases it is important to recall, during the process of testing, the rapidity and abruptness of movements in cerebellar cases, and on the contrary the slowness and weakness also the exaggeration of certain movements in cerebral cases. In cases I, II and IV this peculiarity was in favor of a cerebral lesion. It was noticed in testing for dysmetria by the finger-to-nose method, also in grasping and relaxing objects held in the hand, finally in the test for diadochokinesia.

We have seen above that the psychic symptoms are not sufficiently present to form an important differentiating sign. While exaltation and depression may occur in lesions of any portion of the brain, nevertheless in cases with the above mentioned Witzelsucht, a frontal lobe involvement is to be admitted rather than a cerebellar, for this psychic manifestation has not been observed in diseases of the cerebellum. In the first three cases of my series this symptom was absent, but it was distinctly present in the fourth case. While its presence alone could not decide the question of localization, nevertheless in view of its absence in cerebellar diseases, the possibility of involvement of the frontal lobe in this case strongly presented itself.

The condition of the eyes cannot serve as an important differential symptom with the exception perhaps of the already mentioned fixation of the pupil which is being considered as an early manifestation in cerebellar tumors. But this is the opinion of very few observers,

[13] Bull. Société anat., 1896, p. 702.
[14] Rev. Neurol., 1896, p. 13.

Bruns among others. In my cases the condition of the eyes could not be taken into consideration for the differential diagnosis.

So far we were able to ascertain by a detailed analysis that the character of the ataxia of the upper and lower extremities may decide the question of a cerebral or cerebellar involvement. Should there however be some difficulty in differentiation, the presence or absence of other phenomena already discussed will aid us in establishing a diagnosis of localization. They are: the characteristics of voluntary and passive movements to which André Thomas called special attention; the special features of tendon reflexes emphasized by the same observer; the sign of Holmes and Steward. Finally one of the most important differential signs in my opinion is one on which I have already laid special stress, namely, "the dissociation of localizing symptoms." I pointed out that in my cases there was *no coexistence* of the few cerebellar symptoms on the same side and that on the contrary, while in the same case, some indicated a lesion one one side, other symptoms pointed to the other side, so that if a cerebellar involvement may have been a logical diagnosis its localization was an impossibility. As this occurrence is not the rule in true cerebellar diseases, the diagnosis pointed to a cerebral lesion. This peculiarity was so strikingly conspicuous in my cases that it deserves to be emphasized in the discussion on differential diagnosis between frontal lobe lesions and cerebellar lesions.

It remains now to consider the anatomo-physiological reasons of the similarity between diseases of the frontal lobe and the cerebellum. At the outset of this essay I brought forward one group of facts showing lesions of the cerebrum with crossed lesions in the cerebellum and another group of facts in which an involvement of the frontal lobe was accompanied by cerebellar symptoms although no alteration was found in the cerebellum. To the latter group belong my four anatomo-clinical cases. A question arises as to the mechanism by which a lesion of one produces symptoms of a lesion of the other. The anatomical findings in the first group, as seen from the records of Cruveilhier, Charcot, Turner, Mott and Tredgold, Thomas and Cornelius, von Monakow, Mingazzini and Kononova can be summarized as follows: involvement of cerebral cortex; atrophy of the thalamus opticus, of the subthalamic region and of the red nucleus; involvement of the largest portion of the foot of the cerebral peduncle; degeneration of the peduncular fibers in the pons and of the pontine nuclei; atrophy of the middle cerebellar peduncle on the opposite side; atrophy of the medullary fibers of the opposite cerebellar hemisphere and rarefaction of Pur-

kinje cells in the latter. These facts were observed by the above authors in cases of hemiplegia dating from infancy (in imbeciles especially). Von Monakow[15] submitted the problem to an experimental test. He found that extirpation of a circumscribed area in the cerebral cortex leads to atrophy of certain intracortical nuclei. The suppression of a cerebral hemisphere produces a grave involvement of a chain of neurones. Here two possibilities are admissible. In one degeneration of crural fibers caused atrophy of the gray substance of the pons on the same side; the transverse protuberantial fibers originating here, the middle cerebellar peduncle and the cerebellar cortex of the opposite side became involved. The second possibility is a cerebral lesion producing atrophy of the thalamus and of the red nucleus on the same side, while on the opposite side there is an involvement of the superior cerebellar peduncle and of the dentate nucleus. In Eliz. Kononova's four cases the latter condition was found. In them, in addition to the atrophy of the pontine nuclei on the same side, there was rarefaction of the transverse pontine fibers, of the superior cerebellar peduncle and of the dentate nucleus on the opposite side, also atrophy of three layers of the cerebellar cortex on the opposite side.

In the cases with lesions in the frontal lobe in which atrophy of the cerebellum was absent there is no special difficulty in explaining satisfactorily the presence of cerebellar manifestations during the patient's life. It is sufficient to recall the anatomical data as described by Mingazzini[16] and admitted by Flechsig, von Monakow and others. According to them fronto-cerebellar pathways run through the anterior segment of the internal capsule of which they constitute about one half, then they descend and after forming one fifth of the foot of the cerebral peduncle, they surround the antero- and retropyramidal groups of fibers, cross at the level of the posterior extremity of the pons and enter the middle cerebellar peduncle on the opposite side. It is logical therefore to admit that a lesion of the cerebrum suppressing its activity will at the same time interfere with the function of the fibers emanating from the lesion and will thereby carry its morbid influence to the subjacent nuclei and through them to the cerebellar hemisphere. Thus are explained the various cerebellar manifestations in the cases of frontal lobe lesions recorded by the above mentioned authors and in my own cases. A limited process in the frontal lobe can exert its influence at a distance and produce pronounced cerebellar disturbances of

[15] Arch. f. Psychiatrie, 1895.
[16] Loc. cit.

equilibrium. Ziehen,[17] basing himself on his second case in which against his expectation an abscess in the right frontal lobe was found, presumes that through pressure in the frontal lobe there is pressure of the crossed cerebellar hemisphere against the cranial capsule, thus provoking a local meningitic process over the cerebellar hemisphere. This contention however is not applicable to every case, as in the cases of frontal lobe lesions without tumors there is no direct pressure. In my fourth case for example there was but a hemorrhage of not an extensive nature and consequently the view of direct pressure holds no sufficient ground. The view of functional inactivity of the pathways depending on the original lesion, irrespective of the size of the latter, conforms better to anatomical and physiological facts.

The chief clinical interest lies in the association of symptoms referable to a disputed cerebellar function in affections of the cerebrum thus rendering the diagnosis intra vitam obscure and embarrassing. A correct differential diagnosis is of the highest importance.

[17] Loc. cit.

Society Proceedings

AMERICAN NEUROLOGICAL ASSOCIATION

Forty-third Annual Meeting, May 21, 22 and 23, 1917, held in Boston, Mass.

The President, Dr. E. W. Taylor, in the Chair

(Continued from the September number)

A REPORT OF THREE CASES OF PROGRESSIVE LENTICULAR DEGENERATION

By John Jenks Thomas, M.D., of Boston, Mass.

The cases were found in three children in a healthy family, and showed nearly typical symptoms of the cases described by Wilson, though there was rather marked involvement of pyramidal tracts, tremor of intention type, and progressive mental failure in all the cases. Possible signs of beginning disease in the fourth child. Discussion of relation to Wilson's and other reported cases.

Dr. Ramsay Hunt said that he would agree with Dr. Thomas that the cases reported belonged rather to the group of pseudo-scleroses than to Wilson's disease. In favor of this view was the intention tremor together with evidences of involvement of the pyramidal tracts. The character of the tremor in progressive lenticular degeneration is coarse and rhythmical, and although it may be considerably exaggerated during movement—producing an action tremor,—it is not of the true intention type.

Similar tremor characteristics are also present in juvenile paralysis agitans, the pathological basis of which Dr. Hunt believes to be a primary atrophy of the pallidal system; and while in this group of cases the tremor is often violent and coarse during the passage of the movement, it lacks entirely the essential qualities of an intention tremor. As is well known, the motor disturbances of Wilson's disease are of the so-called extra-pyramidal type, so that the presence of pyramidal tract involvement in Dr. Thomas's cases suggests some other type of nervous affection.

Dr. Thomas said, with regard to Dr. Hunt's question as to whether the tremor should be classed among the action tremors, or among the intention tremors, it was a little difficult for him to determine. The tremor was greatest at the middle of the movement, and it lessened somewhat as the end of the finger was brought to the tip of the nose, but not as much as usual in what he should consider an action tremor. It was more like the tremors we meet in typical cases of multiple sclerosis. The muscular strength was not fully normal; yet it was not as much diminished as one would expect from the presence of the ankle clonus or the Babinski sign. The rigidity was rather more than one would expect from the amount of muscular involvement. The strength of the grasp of the hands in all of the cases was very good and

spasticity was more in the legs where it was very marked. The abdominal reflexes were not affected in any of the cases.

As to the development queried after by Dr. Collins, that was shown best in these children in the history of the development of the trouble, where the first symptom appeared at the age of four years; though it varied somewhat in the different children. In the little girl thirteen years old it began a little later. All he could determine as to development was from the parents and teachers, as the children had not been under his observation. They learned to walk, learned to talk at practically normal ages. They all learned to talk at the age of twelve to fourteen months, and to walk at the same time, as nearly as he could tell from the information afforded by the parents. Relatively as early as two younger children, who were not affected at the time the paper was written. Josephine, the second case (the girl of thirteen), and the oldest boy (now sixteen) were put into school at about the usual age, and were promoted during the first of their school work, and then began to be retarded. That is, the first of their school work was done properly. The youngest child of all, who is now five years old, shows now a mental capacity of four years, possibly a slight retardation, but most likely not a retardation but shyness merely, so that, as to the general result of these mental tests, we may conclude that all these children's earlier development was normal.

In regard to the sugar metabolism, answering Dr. Collins' question, that was not tested. The children lived in Worcester, and while the physician of that place who had sent these cases to Dr. Thomas was very kind in carrying out a good many tests, at the latter's request, that was one phase not studied.

LESIONS OF THE FRONTAL LOBE SIMULATING CEREBELLAR INVOLVEMENT

By Alfred Gordon, M.D., of Philadelphia, Pa.

The study comprises four anatomo-clinical cases, all showing involvement of the frontal lobe of the cerebrum, with symptoms of a cerebellar character. While some of the cerebellar symptoms were quite conspicuous, nevertheless their distribution and association did not present, individually and collectively, the typical features of the cerebellar syndrome. Differential diagnosis. (*Published in full in this issue.*)

PROPOSALS FOR A SEQUENCE OF DISEASE-GROUPS TO BE SUCCESSIVELY CONSIDERED IN THE PRACTICAL DIAGNOSIS OF MENTAL DISEASES

By E. E. Southard, M.D., of Boston, Mass.

The proposals look to a practical rather than a theoretical ordering of mental disease-groups. The classification is "artificial" rather than "natural," as John Stuart Mill used those terms. The familiar issues of etiology and entifiability are not here raised. Instead, the *fundamentum divisionis* is the practical ("artificial") one of separation along lines of available tests in the interest of differentiated treatment or counsel; *e. g.*, the syphilitic group stands first, neither in virtue of frequency nor of theoretical simplicity, but because of the complement-fixation test, and the therapeutic possibilities in the syphilitic group. But the method is not necessarily one of successive elimination of disease-groups until the correct group is reached. In the majority of cases the entire gamut of a dozen or more groups must be applied. For a given case may be one, *e. g.*, of a syphilitic, feebleminded, epileptic, alcoholic, senile with coarse brain disease. A provisional sequence is composed of the syphilitic, feebleminded, epileptic, alcoholic, encephalopathic,

somatopathic, senescent, schizophrenic, cyclothymic, psychoneurotic, psychopathic, special, dubious, and simulant groups and the non-psychotic.

Dr. White declared he rose with some hesitation to discuss a paper by Boston's most promising, because most called for, citizen; but, with respect to this classification, it seemed to him like a sort of a second-wind classification. One has become confused by the enormous amount of details, and recurs to a more certain standpoint. The principle of the thought, he took it, is that each one of these terms is such a term as will surely include the case under consideration. Of course, that is the principle upon which all scientific classifications have to go along: that our classification should include the case, certainly; and then we posit and become more explicit and detailed; then we have to improve our classification and go ahead. Details, of course, are always in advance of any capacity for fixed classification and naturally, if this were accepted to-day, it would have to be set aside tomorrow; because the whole scheme has to remain dynamic.

One point which Dr. Southard did not emphasize very much was with reference to his alcohol and palsy, that he would classify cases of alcoholic epilepsy as epileptic, if he wanted to send them to a specialist in epilepsy. That was, he thought, a perfectly practical method of doing things. Bergson, in his philosophy, has shown that we perceive things only just exactly along the lines in which we propose to act upon them, and that the provision of the whole sensory side of the nervous system is, after all, nothing, except it be a preparation for action. So that we may very properly be considered entirely in terms of energy as *acting* organisms, in which perception prepares the motor set for particular actions. Now, an alcoholic, for example, with nervous paralysis of the diaphragm, or what not, would be considered by the internist as belonging to his specialty; because what he wants to do for him is to relieve this particular organic trouble; and he would not think of it as a case belonging to the psychiatrist; because he, not being a psychiatrist, would not want to do anything affecting the underlying character of a directly alcoholic manifestation. The psychiatrist, on the other hand, would look upon the alcoholic case as a psychiatric case; because he would see about the man something to correct in the underlying character that he thought made him an alcoholic; so that it depends upon what we want to do for the man, how we would classify him; and how we would classify him would depend upon our depth of insight into the man as a whole and the nature of his illness. So that here is a very practical method of classification, and it will be changed according as our ideas will change as to what we shall do with respect to these different problems.

Dr. Dewey wished to express his very great appreciation of the view that Dr. Southard had spread before them of the field in which they were all laboring, believing it to be illuminating and broadening to the common view. There was nothing he would change or suggest, except that the age-process, it seemed to him, should, perhaps, have included a little more than it does when translated into a Greek equivalent as in the "geriopsychoses" we are not able to classify the crises of adolescence which one meets with in practice; and he knew not whether the climacteric period was intended to be included, but it seemed to him that some word that would embrace those forms would be desirable.

Dr. Walton was very glad to see that, up to this time, Dr. Southard's paper had met with favor; this showed progress since the reading of a paper by Dr. Walton before this Society some years ago suggesting the freer use of the collective term psychoneurosis and the discarding of neurasthenia and psychasthenia. At that time not a single person had spoken in its favor. Dr. Prince, he remembered, had told about an old lady who sat on the stairs of an institution rocking from side to side, saying "nobody knows, nobody

knows." Her case was matched, however, by the old man who sat on the floor in another institution pushing around bags of variously colored, but otherwise identical beans, and as he arranged and rearranged them in artificial groups he continually said: "Groping, groping, groping!" Perhaps the fact that Dr. Southard has adopted Dr. Walton's suggestion unduly prejudices him, but his plan certainly seems to Dr. Walton logical and practically workable.

COMMITMENT TO PSYCHOPATHIC HOSPITAL AS RELATED TO QUESTION OF PERSONAL LIBERTY. ADVANTAGES OF A PROPOSED LAW FOR DETENTION INSTEAD OF PRESENT LAW FOR COMMITMENT

By Richard Dewey, M.D., of Wauwatosa, Wis.

Law requires public record of insanity and court commitment for patients admitted to psychopathic hospitals. Patients and their friends object to this publicity. This leads to delay and often prevents proper care and treatment. This is, without doubt, an important factor in the increase of insanity. It would be better if patients could go to the psychopathic hospital precisely as to any other hospital. If the law were so modified as to take cognizance of *detention,* instead of *commitment,* then no cases need come before the court except such small minority as objected to commitment or demanded release. The psychopathic and detention hospitals are already under the jurisdiction of the courts, and these courts could ascertain through their own independent agencies at stated, regular, short intervals whether any individual were detained against his or her will, and duly institute process *de lunatico inquirendo* wherever required. The object of this paper is to inquire whether the safeguarding of personal liberty could not be equally well secured in the manner above indicated. A draft of a law embodying these suggestions is submitted.

Dr. Angell said he should like to approve of this paper by Dr. Dewey, but it seemed to him that he was simply changing one term for another. The essential feature of it was the commitment, and the allowance to the patient of a certain amount of liberty during the period of the commitment. He had had rather large experience, of course, as all the members had had, in committing these cases; and the only difficulty he had had was with the ignorant foreign population, or the second generation of foreigners. They come here with a very different idea of what a hospital, a sanitarium, or a state institution is in this country. The foreign idea of a hospital is that it is more or less of a prison; and he had found it utterly impossible for a time to get these patients to do the right thing on that account. We have the privilege in New York State of sending such cases to the hospitals for the insane, as emergency cases for a brief period of time. This method advocated by Dr. Dewey might avoid the difficulty encountered in dealing with the insane among the foreign or foreign-born population.

Dr. Southard thought Dr. Dewey's point well taken. Eventually there might still be a group of the psychoses of adolescence which might perhaps be termed *ephebic* psychoses. For the moment, however, in the absence of differential points for these ephebic psychoses, Dr. Southard felt that the majority of psychoses of adolescence fall into the schizophrenic or cyclothymic group. Dr. Dewey's point emphasized Dr. Southard's contention to the effect that his scheme was a purely practical one. The moment some new and powerful differential sign or symptom or group of signs and symptoms should be brought out, then at that moment a new group would be interpolated in the series. This new group would be placed at the head of the column or at any point lower down, according to the force and value of the new differentiæ.

In conclusion Dr. Southard said it was not the names of the new groups so much as the groups themselves that were important and that still more important than the details of the entities that might compose the groups was, for practical purposes, the sequence of the groups. The kind of criticism which he would like to receive concerning his proposed key to the practical grouping of mental diseases was criticism as to the order of the groups.

Dr. White said it seemed to him that the voluntary commitment laws that are in force in several states would cover most of the things that Dr. Dewey wished to accomplish. He had thought that something more might be accomplished by a commitment law which did not go any further—unless under some special reason—than to authorize the hospital to control the person of a patient; in other words, did not remove his self-respect, his capacity to transact business; did not impose any legal disability. The difficulty here, of course, is, that insanity is not a medical term at all; it is a legal term, and the commitment in the courts is a legal procedure, which takes away from a person, absolutely without distinction, his citizenship, his capacity to exercise his citizenship, and imposes a legal disability. He did not believe that in 95 per cent. of the patients sent to institutions there was any reason for imposing this disability; and it would seem to him that a commitment law which merely protected the hospital or the superintendent from suits (he had one at the moment pending, therefore spoke feelingly) based on charges of illegal detention, would be all that was necessary in the vast majority of cases.

He had been under the conviction that the average lawyer would oppose Dr. Dewey's scheme very strongly, because it involved the dealing with moot cases, involved hunting up material and dealing with that when any question was raised. The courts existed, so far as he knew, for purposes only of dealing with controversial situations, and this bringing in the hospital would seem as if the medical fraternity were calling upon its legal friends to help them say who are medical patients. Dr. Dewey's experience with the court in his particular jurisdiction might indicate to him there is no other way than he had stated; but the speaker felt that courts retained the superstitions and the ignorance of the folk soul longer than any other profession or body of people in the community; and to ask juries, with all their superstitions, to advise us what to do with our mental cases, is reversing the natural order of things. We might confer with them when called on; but we should insist that the courts take our advice, and not ask them for their advice.

Dr. Knapp believed that in the treatment of our patients we should be absolutely divorced from the superstitions and antiquities of the law; but there is one method of dealing with these cases which Dr. Dewey had suggested, namely, that they should go to a general hospital. If a general hospital has a suitable man at the head of a service to deal with such cases—which may be the so-called borderland cases, doubtful cases and even the emergency cases—they can be dealt with with comparative ease. Of course, there is a fight such as the speaker had been watching for the last eight years, between the executive, matrons and nurses who think that such cases are troublesome, and the man at the head of the service, who wants to have those cases in his wards, but there is really very little difficulty in handling the average case.

The friends will send patients into a nervous service where they won't send them to an insane hospital service; they will stay there and can be observed; they can be, as a rule, managed, and a decision can be made without limitations of time. A case may be kept in the wards for three days or five or ten weeks, if need be, until plenty of time to make investigations and settle diagnoses is afforded, and then, if need be, they can be committed; and the cases requiring temporary care often clear up in the general ward

of the hospital. He had, for example, seen cases much excited, for one cause or another, quiet down and be able to go out well men, without any formal commitment, and do very well outside; and other cases can be investigated thoroughly, with all the methods of psychological diagnosis, and with the help of all the tests and experts of the other departments, and they can be managed perfectly well. The advantages of a general hospital are not as good, but cases can be handled with comparatively little trouble.

Dr. Hoppe said his experience, in a large general hospital, for a good many years had been in keeping with Dr. Knapp's statements. They admit nearly all, or at least a good many, of the mental cases of the city of Cincinnati, or cases suspected of mental diseases, to the general hospital The probate court rules that each one of these patients, brought to this department, shall be brought there with the coöperation or at the instigation of his or her friends, or of the police; the result being that the ruling of the courts in the investigation and commitment of these cases is the only authority the service can recognize; that neither the hospital staff, nor anyone connected with the hospital, has any legal rights in these cases; that commitments must always be made at the request of the nearest relatives, or the friends, or by the police department. . . .

Sometimes these patients must be discharged at the request of relatives or friends, and they are obliged to sign an application for discharge which frees both staff and hospital from any responsibility. This was the only difficulty Dr. Hoppe's institution had had in keeping patients as long as was desirable; there was no legal limit placed.

Dr. Dewey, closing, said he was aware that the legal form for detention, as set forth in his paper, was substantially the same thing as that for commitment. The difference as it seemed to him was this: that whereas it is now applied to all the cases before admission, it only need be applied to the very limited number for whom involuntary detention might be needful. In such institutions as those presided over by Dr. Knapp and Dr. Hoppe, patients were received without any legal formalities, they obtained adequate treatment, and no questions were raised about their detention; that is all as it should be. In this proposal, however, Dr. Dewey sought to visualize the entire situation. He knew that in Boston ideal conditions prevailed for the emergency commitment, and for the holding of patients pending observation, and for voluntary commitment, but such conditions were altogether exceptional. Conditions in Boston, New York, Baltimore and Cincinnati are not such as generally prevail. The working of "the detention hospital," as it is called at Chicago, as one of the speakers remarked, had suggested to Dr. Dewey the possibility of a method that would be vastly less cumbersome, and less expensive. If a detention hospital contained a court room and necessary equipment with an opportunity for court to be held, the patients could, whenever necessary, be given a hearing and the case could be thus disposed of. Such provision is not now generally made, but he believed that every large city would, in the end, be best looked after in this respect if there were a psychopathic hospital under the jurisdiction of the county court. Cases that required it would receive proper attention. In Illinois the jury law, that had existed for many years, had now been largely replaced by commission law; the cases are not "sat upon" by a jury to nearly so great an extent, but a commission is appointed by the court to examine and report upon them. He thought that these matters tend, in every locality, according to that particular locality's characteristics, to adjust themselves, but a plan something like that he had outlined would, he believed, be of practical utility.

(*To be continued*)

NEW YORK NEUROLOGICAL SOCIETY

May 1, 1917

The President, Dr. Frederick Tilney, in the Chair

A CASE OF SYRINGOMYELIA OR LEPROUS NEURITIS

By H. Climenko, M.D.

Dr. Climenko presented this case for differential diagnosis. The patient was a man 58 years of age, born in this country of American parentage. A brother died of tuberculosis. He was rather illiterate, having been backward in school life and with a poor memory. His stature was never erect. The present illness had its inception thirty-three years ago in some form of infection of the left arm with a secondary infection extending to the right arm. The deformity of the right hand consisted of a flexure at all the interphalangeal joints; the left might be called a paw hand and there were marked trophic changes of fingernails on the left. There was a scaly appearance of the skin of both hands.

This case, that later will be reported in full, showed symptoms that might easily be attributed to leprous neuritis as well as symptoms that would lead to a diagnosis of syringomyelia, which was probably the true one in the opinion of Dr. Climenko.

Dr. Edward D. Fisher wished to ask if there was any deviation of the spine.

Dr. Walter Timme said that some years ago he had the good fortune to be allowed to examine a number of cases of leprosy in Bergen, Norway, at the Leper Hospital, and this case of Dr. Climenko's impressed him as being in some respects similar to some of the cases there; the atrophic condition of the skin, the condition of the extremities and the few scars, on the whole, resembled types that were undoubtedly leprosy. This case lacked the pathognomonic scars on the fingers which were rarely absent in true cases. On the other hand, leprous neuritis was not accompanied with loss of reflexes, as a rule. It was difficult to recognize some of these cases without the presence of the germ being demonstrated, so that the diagnosis was still open. The speaker thought that treatment with oil of chaulmugra might tend to clear up some of the symptoms, in the event that it was a case of true leprosy.

Dr. William M. Leszynsky asked Dr. Timme if it was likely that a man would have such a condition of the hands for thirty-three years and not have suffered some progression of the disease if it were due to a leprous neuritis. He favored the diagnosis of syringomyelia.

Dr. Timme replied that children at the age of eight or nine when the disease started might remain in the same condition until fifty or sixty years of age. The cases usually began with pain in the extremities, but this one did not. He had seen cases in which the disease had remained quiescent for decades.

Dr. S. P. Goodhart said that when he was in Cuba, he visited the Leper Hospital in Havana and saw many cases, resembling Dr. Climenko's, that began with symptoms indicative of neuritis. The every extensive trophic changes, together with the history of onset, very strongly suggested those seen in Havana. If this were a true syringomyelia, there ought by this time to be some obtrusive changes on the motor side; however, the type of sensory dissociation spoke for this diagnosis, which he was inclined to believe was the true one.

In closing the discussion, Dr. Climenko returned an affirmative answer to Dr. Fisher; the spine was deviated. There was also marked myokymia and the Wassermann, both fluid and serum, was negative.

When first studying the case, it seemed that the diagnosis would prove to be syringomyelia; the peripheral nerve condition as well as the skin, however, might speak for leprous neuritis. The patient had bulbar symptoms, difficulty in swallowing, nystagmus—all characteristic in the differential diagnosis between this condition and leprous neuritis. The progress was that of syringomyelia and there were other points speaking for this diagnosis. He had hoped that the members of this Society might suggest a name for the peculiar deformity this patient presented.

CEREBRAL EDEMA IN SCARLET FEVER

By Charles T. Sharpe, M.D.

The speaker described this condition, which he had observed in several cases, where it masked the ordinary clinical picture of the disease so that there was some doubt as to the diagnosis. In scarlet fever the rash might be atypical and the mental condition marked and grave doubt might arise unless the variation in type were recognized. In addition to scarlet fever, edema of the brain sometimes occurred during the course of measles and diphtheria, as well as poliomyelitis, the recent epidemic having offered splendid advantages for the study of the latter.

The primary involvement might be that of the central nervous system. The mental symptoms might predominate from the beginning, or they might not develop for twenty-four to forty-eight hours after the onset and they sometimes persisted for weeks after convalescence from the infectious disease.

There was an interrelationship between the cerebrospinal pressure and that of the cutaneous circulation. This relationship was one of inverse variation. In the infectious diseases, both during the early and late periods of the illness, marked cerebral symptoms were frequently noticeable, as evidenced by stupor, low, muttering delirium and slight retraction, possibly edema of the brain, relieved by a profuse cutaneous eruption, the outbreak of which was a favorable prognostic omen.

In the early stages the evidence of edema was to be found in the stupor, retraction of the head, the cephalic cry, the upward retraction of the eyes, muscular twitchings, tache cerebrale, delirium out of all proportion to the temperature, marked Macewen's sign, increased reflexes and, in some rare cases, paralysis, a positive Kernig, Babinski and Oppenheim. The correctness of the diagnosis is proven by lumbar puncture with release of spinal fluid under increased pressure and by the analysis of this fluid. In the later stages, the evidence was to be found in the melancholia and phobias in some cases, while in others there was hyperexcitability. The fact that the condition cleared up with spinal puncture and other appropriate treatment removed the probability that the condition was due to another underlying condition, especially when they subsequently regained and retained normal mentality and health. Other evidence of the edema was to be found in the varying degrees of retinitis, congestion and blurring of the discs noted in these patients.

Edema of the skin, with infiltration of the tissues by leucocytes, was a feature of scarlet fever. If, then, the rash "struck in," as the old expression had it, one might expect to find this edema in that portion of the body that had an inter-relationship, as to pressure, with the skin. One might there-

fore expect, from the clinical evidence, that the cerebrospinal axis would be the part to exhibit this edema, and the speaker believed that this is what did occur.

Dr. L. Casamajor said that when he had had opportunity to see Dr. Sharpe's patients they had recovered, so that none of the delirious features came under his observation. However, there was evidence that these children had formerly suffered from cerebral edema and it was therefore fair to assume that the edema had been a part of the clinical picture. Moreover, the sections showed edema which was quite marked and infiltrations, especially in the lymph spaces of the brain, spoke for severe edema accompanying an infectious process. This delirious picture might not always follow edema, though Dr. Sharpe's point was well taken that there was such a clinical picture of a nervous system rash accompanied by infiltration.

THE PATHOLOGIC EFFECTS OF STREPTOCOCCI FROM CASES OF POLIOMYELITIS AND OTHER SOURCES. ILLUSTRATED WITH LANTERN SLIDES

By Carroll G. Bull, M.D.

Dr. Bull said that prior to the recent epidemic it was not believed that poliomyelitis was caused by any organism that could readily be detected in or cultivated from the body fluids or tissues of victims of this disease. It had been experimentally established that conditions similar in every respect to poliomyelitis in man could be brought about in monkeys. Furthermore, it had been shown that this condition could be passed from one monkey to another by inoculating these animals with brain emulsions or filtrates. Therefore, the infecting agent was termed a filterable virus.

The recent epidemic, however, stimulated investigation on many lines and new conceptions arose as to the etiology. A streptococcus organism was cultivated from various tissues of poliomyelitis patients; the throat, tonsils and blood during life; the cerebrospinal fluid, the central nervous system lymph nodes at autopsies. Mathers said he had been able to cultivate a streptococcus-like organism from the brain and cord of fatal cases, and this organism when injected into rabbits brought about a condition clinically similar to poliomyelitis and caused pathological lesions in rabbits which were similar in every way to the pathology of poliomyelitis in man. Rosenow, Towne and Wheeler cultivated the same organism which they said caused a condition resembling poliomyelitis in rabbits, guinea pigs, dogs, cats and monkeys. Further experiments of these workers showed transmutation from the streptococcus-like organisms to small globide bodies.

Since these results were not in harmony with the work of other experimenters, Dr. Bull and other pathologists at the Rockefeller Institute endeavored to verify them. Streptococci were collected from the tonsils of a number of cases of poliomyelitis and their effects on various animals studied. Streptococci were isolated from the tonsils in other conditions as controls, an endeavor being made to get streptococci from children who had been exposed to the disease during the epidemic.

Various animals were used. With streptococci from the tonsils of poliomyelitis cases 12 guinea pigs were inoculated without effect. Four cats were inoculated; only 1 was affected and with meningitis.

16 dogs ..... { 1 flaccid paralysis.
1 arthritis
4 meningitis.

88 rabbits ..... { 4 flaccid paralysis.
16 central nervous system and abscesses.
31 arthritis, nephritis, endocarditis, neuritis and infections of other parts of the body.

Six monkeys were inoculated in the cerebrum and circulation; there was very little result; 1 showed infection of the central nervous system, meningitis, 2 extra-nervous infections and 2 died. Aside from that there were no infections. In none was there paralysis or anything resembling poliomyelitis, pathologically or clinically.

Cultures were made from the spinal cord and brain of poliomyelitic monkeys and streptococci were obtained which produced various lesions but not poliomyelitis. The only lesions shown in common with poliomyelitis in monkeys and man were not specific. Monkeys immunized with the streptococci had no undue resistance to inoculations with the virus, though monkeys recovered from infections with the virus were resistant.

There was no increased resistance with immunization of streptococcus, nor did streptococcus-immune serum neutralize the virus. Streptococci from conditions other than poliomyelitis produced symptoms and lesions indistinguishable from those caused by the poliomyelitis streptococci.

THE ACUTE PHASE OF ANTERIOR POLIOMYELITIS

By George Draper, M.D.

The speaker summarized his observations on the importance of the symptoms presented by slightly ill children during an epidemic. Three hundred or more on Long Island last summer were studied. The apparent fluctuation in virulence of the virus in different localities and periods, the wide range of susceptibility and the peculiar sequence of events in the clinical course of the disease itself contributed to the difficulty of early diagnosis which was very important in view of the necessity of preventing the establishment of damaging lesions in the cerebrospinal nerve tissue. As paralysis was the only known undesirable result of recovered cases of acute poliomyelitis, it was necessary that therapeutic effort should be directed so as to prevent this.

The untreated cases were arranged in three groups according to the clinical course. Group I showed the curious phenomenon of two different periods of illness with an interval of well being. In Group II this period of comparative well being was not present, but there was a sustained period of indisposition of varying intensity. In Group III only did all the signs point from the start to meningeal and nervous involvement.

One physical sign of great importance was the spine sign. It depended on the fact that in acute poliomyelitis any manipulation which brought about anterior bending of the spine caused pain and was therefore resisted.

In Groups I and II there developed a picture of general systemic infection from which the patient appeared to recover completely, or in part, and then to receive a second blow directly on the cerebrospinal tract. The so-called abortive cases were in all probability examples of the disease in which the first period in Group I constituted the entire course of the malady, the meningeal stage either never occurring, or, if it did, in so slight a form as to pass unrecognized. The term "abortive" gave a wrong impression; it would be better to speak of acute poliomyelitis, with or without paralysis.

Early repeated lumbar puncture was of diagnostic value; the tendency of the patients with the higher cell counts in the early hours was toward paralysis. After thirty-six hours the cell count in the spinal fluid was of little or no prognostic value. The evolution of the disease was rapid and its course must be considered in terms of hours, not days.

Dr. H. L. Amoss referred to Dr. Bull's description of the streptococcus which he obtained from the cerebrospinal fluid; the virus of poliomyelitis, however, had not been detected in the cerebrospinal fluid. It had not been possible at the Rockefeller Institute to duplicate Dr. Rosenow's experiment in bringing about the transmutation of streptococci into globoid bodies. Dr. Bull recently observed the persistence of streptococci in a rabbit's brain for 131 days. It had been reported that rabbits had been infected with poliomyelitis, but the pathological condition was new and not yet understood. Upon injecting poliomyelitis virus into a rabbit's brain, sacrificing the animal at the end of seven days and thereupon injecting the material obtained from the site of inoculation into a monkey, the monkey remained well. But if the material was taken after only four days, the poliomyelitis virus was found to persist and was infectious for the monkey.

In July, 1916, in Westchester County, a limited number of cases of poliomyelitis were treated with serum. There were few fundamental facts on which to base this treatment. It was known that a second infection of poliomyelitis was rare, and that monkeys were not susceptible to second injections of virus after they had once responded. Many years ago, Flexner and Lewis conducted experiments on the treatment of experimental poliomyelitis. They injected monkeys with poliomyelitic virus and treated them with serum obtained from paralyzed monkeys. At that time they experienced difficulty in obtaining results, owing to the fact that poliomyelitis for monkeys is a severe infection, producing a mortality of almost 100 per cent. In some animals, however, they were able to delay the infection and in others could prevent paralysis. Later, Netter and Salanier applied this method of treatment to human beings. They injected serum from recovered cases intraspinally in thirty-two patients. Their results indicated clearly that at least no harm was done.

In poliomyelitis the tissues affected are difficult of access and it is not easy to bring sufficient serum into the interstices of the spinal cord, although the permeability of the cord is probably increased by the inflammatory process. In employing the serum treatment, it was considered desirable to give injections as early as possible in the disease, and in large doses. As the amount of serum obtainable was limited, mixed serum secured from several recently recovered human cases was used, the purpose being to obtain an optimum percentage of immune bodies. The cases for treatment were selected, not on the basis of the severity of the disease, but according to the stage of illness, early cases being chosen. Unpreserved, inactivated serum, free from hemoglobin and fat, was used. The serum was kept for ninety-six hours prior to injection and was tested bacteriologically.

In all, 26 patients received the serum treatment. Twelve showed simple paralysis before the injections, 14 had no paralysis at the beginning. Of the 14 cases, 2 died of respiratory paralysis and in 2 the paralysis increased. Ten showed no increase in the paralysis, but, on the contrary, immediate improvement. Of the 12 patients in whom serum was given under optimum conditions, 11 exhibited immediately a drop in temperature and improvement in the paralysis and clinical condition.

The serum was not injected by the intraspinous route alone, because a sufficient amount could not be given in this manner, and the object was to give as large doses as possible. The average dose was 20 c.c. given intraspinally, after the removal of a larger amount of spinal fluid; the remainder of 30 c.c. was given intravenously and subcutaneously. The larger the amount of serum and the earlier it was given, the better were the results. The serum was not administered unless the patient was in the febrile stage.

The intraspinous injection of any serum results in a disturbance of the normal adjustment represented by the choroid plexus, and makes itself

known by increased permeability. There is also a polymorphonuclear reaction. However, the injection of serum from recently recovered cases more than compensates for the disturbances thus brought about.

The following conclusions were drawn from the experience of these twenty-six cases:

When serum was used from recently recovered cases of poliomyelitis and injected early in the course of the disease, the treatment had no disadvantages.

The action of the serum appeared to be more potent in arresting the paralysis than in bringing about retrogression.

The problem of multiple injections had not been completely solved, but it might be said that large amounts of the serum should be given at first. If these were not effective in lowering the temperature curve, the dose should be repeated.

As much serum as possible should be given intraspinally and the remainder subcutaneously.

Patients over three years of age should receive at least 50 c.c. serum from recently recovered cases. If serum from more remotely recovered cases was used, correspondingly large amounts should be employed.

Dr. I. Strauss said that these papers did not lend themselves very well to discussion, as they were so complete in themselves and conveyed so much of value.

However, a few questions had arisen which might bear a little comment. The first related to Dr. Draper's chart; was it to be inferred that some of the cases recovered at the end of the first phase? Because, if that were so, looking at the symptoms one would be entitled to question the diagnosis. No symptom on the first part of that chart was a symptom one could consider characteristic of poliomyelitis. In an epidemic one was justified in suspecting such a case to have the disease, but with no increase of cells in the cerebrospinal fluid there was not sufficient data for a diagnosis. If they went on to the second phase and there was additional evidence of increase of the cellular content in the spinal fluid, then there was no doubt as to the nature of the disease.

Regarding Dr. Bull's paper, the speaker wished to say that when this work on streptococcus findings first began, the neurologists who read the reports must have felt that they were dealing with a psychical complex, and that the individuals doing the work required some form of psychoanalysis. Scientists, as well as other people, were subject to the influences of psychic complexes, and this whole school with Rosenow at the head, followed by Mathers and Nuzum, seemed to be possessed with one idea—namely, the streptococcus complex. Studying the reports of this school, one would find that the streptococcus had been declared the etiologic factor in diseases ranging from ovarian cyst to goitre, to ulcer of the stomach, and now to poliomyelitis. It was strange that the specific streptococcus should have escaped the bacteriologists of the New York group. It was not discovered until there was a transmutation of the Chicago group to New York. Furthermore, although the board of health laboratory cultured one thousand specimens of cerebrospinal fluid, the streptococcus could not be found. At Mt. Sinai they had done this repeatedly and the streptococcus was not found

It was interesting to note that the virus of poliomyelitis was not found in the spinal fluid by any investigator until the Chicago school began their study. Neither did blood contain it. Who, having seen streptococcus infection in a human being, or a streptococcic meningitis, had failed to find the streptococcus in the spinal fluid or in the blood?

This work of Dr. Bull recalled to the speaker at least one fact in science; that a theory was generally wrong until it had been proven by making controls constantly and repeatedly, as Dr. Bull had done.

Regarding the treatment, Dr. Amoss recognized the great difficulty under which he was laboring in attempting to make deductions from the few cases he had had. The speaker could show him reports of untreated cases at Mt. Sinai in which the temperature fell by crisis. No matter what treatment was used, whether adrenalin or serum, the same results would be shown in another child who had not been treated. That was the difficulty in valuing any form of treatment until a remedy was found which acted as a specific remedy did in other diseases.

The speaker noted what Dr. Amoss said about the physiology of the spinal fluid. Neurologists knew that the spinal treatment of syphilis had its origin at the Rockefeller Institute, and there was analogy between syphilis and poliomyelitis in that the virus of both were in the cord and brain; but if he admitted that one could not treat poliomyelitis by intraspinous injections alone, it was just as illogical to try thus to treat syphilis.

Dr. Herman Schwarz (by invitation) said that he had treated twenty-one cases last summer with convalescent serum which was obtained from people who had had the disease a few months to four years previously. The cases were divided into what he called the cerebral type, the main symptoms being rigidity of the neck and increased reflexes, and the spinal type, where the reflexes were diminished.

The number of these cases was not sufficient to warrant a definite statement concerning the value of the serum. It was used only intraspinously, repeated injections being given every twelve to twenty-four hours, as much as 60 c.c. altogether in some cases. The general impression was that serum had very little influence upon the extension of the disease in the cerebrospinal system and therefore in the limitation of paralysis or the prevention of bulbar symptoms. All those who were given serum and did not show paralysis were cases of the cerebral type. The use of serum was certainly indicated until something were proven to be more efficacious. It had done no harm and many observers believed it to be of considerable value.

Regarding diagnosis and prognosis, spinal puncture was most helpful in the early stages, as Dr. Draper said. Increased number of cells and increased globulin usually pointed to a poliomyelitis when combined with a clinical picture of an acute infectious disease. The cell count did not appear to have any great value as an index to either recovery or death, paralysis or no paralysis. Polymorphonuclears associated with or without a high mononuclear count seemed to point to a more favorable prognosis. In the early stages of the disease there was at present no real diagnostic clinical sign, for during the epidemic many cases started just like any other infectious disease, such as grippe, measles or tonsilitis, would begin.

CHICAGO NEUROLOGICAL SOCIETY

March 15, 1917

The President, Dr. Harold N. Moyer, in the Chair

THE ORIGIN AND DETECTION OF THE TOXIC AMINES OF DEMENTIA PRÆCOX; THEIR ELIMINATION: EXHIBITION OF TWO PATIENTS

By Bayard Holmes, M.D.

Dr. Holmes said that it was early observed that the brain weight as compared with the cranial capacity of dementia præcox cases was increased, and this, too, in spite of the fact that old cases were generally somewhat hydrocephalic.

Various studies have been made of the inorganic composition of the brain and it has been determined that the sulphur content of the dementia præcox brain is excessive.

In the study of the blood of dementia præcox cases rapid changes are noticed in the leucocyte count, and these are synchronous with the rapid changes of symptoms.

The concentration of the blood, especially in katatonic cases and those attended by cyanosis, is increased, the number of red corpuscles being greatly in excess, but fluctuating with extreme rapidity from unknown causes. In some of these cases there has been an obvious and persistent methemoglobinemia.

By means of defensive ferment reactions it is positively determined that dementia præcox cases show the presence of enzymes indicative of destructive changes in the sex glands, and generally destructive changes in other of the glands of internal secretion, and in some cases of the cerebral cortex.

The conjunctival adrenalin reaction of the iris is positive with a few drops of adrenalin. This is similar to the reaction of an isolated eye or one in which the ciliary ganglion is removed, or one upon the same side of the body as the injury to the superior sympathetic. It does not occur in healthy individuals, but it does occur in those who have suffered intoxication with large doses of ergot; for example, in women after labor.

The blood pressure in dementia præcox is generally low and in most cases it is below eighty-five. The subcutaneous injection of half a c.c. of adrenalin, 1 : 1000, does not raise the blood pressure, but generally causes it to fall from ten to twenty-five millimeters of mercury without disturbing the frequency of the pulse. This is not the case in healthy individuals, but does occur in those who are intoxicated with ergot and in some patients with persistent low blood pressure.

In epidemic ergotism, which still prevails in Russia and has been subject to careful study, more than one fourth of all the patients attacked by the disease show unmistakable signs of mental aberration, and this is especially true of young adults. It is observed further that if they live and recover from the ergotism they are not as bright as formerly, and some of them show progressive deterioration.

The activity of ergot is due to ten toxic amines. One of them, histamine, is responsible for the oxytocic action of ergot. This amine contracts the uterine fibers and produces spasmodic contraction of the musculature of the fine bronchial apparatus, producing in toxic doses the symptoms and findings of anaphylactic shock. It causes a fall in the blood pressure which the injection of adrenalin increases or, at least, is unable to counteract. Some of the toxic amines of ergot are synergistic to histamine in one particular, while being antagonistic in another.

Because the patients with dementia præcox presented the general symptoms of a toxemia, and because they showed the adrenalin paradoxes in the dilatation of the pupil and in the fall of blood pressure, it seemed desirable to search these patients for the presence of a toxic amine capable of lowering the blood pressure.

The stools of a number of patients were examined and in seven cases of dementia præcox a substance was found which gave the physiologic reactions of histamine.

In a number of other healthy and sick people no such substance could be isolated.

This led, then, to the investigation of the conditions under which histamine is produced. It was found that a 5 per cent. solution of histidine incubated at 37° with the *Bacillus aminophalus intestinalis* for five days resulted in the complete reduction of the histidine to histamine. The fluoroscopic

examination of the intestinal tract of dementia præcox patients demonstrated a retardation in the cecum lasting from fifty-four hours to one hundred and twenty hours, and in one case to five weeks. The form of the cecum was found to be retort-shaped with a spasm of the sphincter of Cannon which was so complete that massage of the cecum would press out bacillus-shaped masses of the test meal into the empty distal colon. It was possible in a few instances to get photographs showing the condition of the cecum and the spasm of this sphincter. In three laparotomies made upon dementia præcox patients, the thickness of the cecum was found to be greatly increased; so much so indeed that it resembled the normal stomach.

Five well-marked cases of dementia præcox, one of which had been subjected to the foregoing studies, were chosen for irrigation of the cecum. An appendicostomy was made and as soon as the wound was healed the cecum and colon were daily washed out with four to six quarts of warm water. The time of the irrigation was five hours after the last meal and when all the aminoacids would be passed through the iliocecal valve.

The results of these examinations may be briefly stated. The blood pressure has risen in every case to 100 or more. The physical condition of the patient has improved; they weigh from twenty to thirty-five pounds more than they did when the irrigations were begun. The first patient was operated upon the last of July; the last one during the last month. The patients presented show little inconvenience from the wound, and are little disturbed by the irritation. Only two different materials have been added to the water. On account of the deaminizing properties of yeast this has been most generally used, but in a few instances a solution of benzoate of soda has been tried. The patients have been given no medicine except the calcium and cod liver oil for the hypothetical spasmophilia.

Dr. Julius Retinger stated that the Abderhalden reaction in these cases almost completely confirmed the findings which had been made in Germany and Russia; namely, that the most characteristic reaction indicates changes in the cerebral cortex, the sex gland and small intestine. He said the reactions in the glands of internal secretion came so irregularly that he thought they could not be characteristic. He said he had examined twenty stools of dementia præcox cases, two or three of gastric crises, and other diseases looking for the histamine which might be produced. He had followed the method which Kutscher describes with a few changes. After precipitating the bulk of amines with phosphotungstic acid he separated the different cases by fractionated precipitation with silver and mercury. He was not interested in the quantitative estimation of these amines because it seemed too tedious and difficult for quick and qualitative analysis, so he shortened the way in this way; after making alkaline with baryta the precipitate he shook out repeatedly with ether. He merely wanted to be able to prove or disprove the presence of histamine in the stools. He said he knew that histamine gave a very characteristic skin reaction; a 1 : 10,000 histamine solution if injected intradermally, produced a very marked reaction. Of the several possibly present amines three were also examined as to their cutaneous reaction, but failed to give it with the exception of adrenalin, which occasionally gave a reaction in a very much smaller degree. So when he examined the stools and got a reaction he considered histamine to be present. He said he knew this method was crude, but for control the samples he considered positive and those he considered negative were sent to Dr. Hamilton at Parke, Davis and Company's laboratory and the results were confirmed by the guinea pig's uterus method. He thought that while it was not a quantitative reaction, it showed qualitatively that an adrenalin mydriasis and the lowering of the blood pressure by adrenalin occurred in those patients containing histamine in stools and in the others did not.

Dr. L. J. Pollock said that experimental work tending to determine the cause of dementia præcox was fraught with many difficulties. First, because there is no very accurate clinical differentiation of the groups of this disease. We have to work with a group of cases which have been included in a mass which has been called dementia præcox because of certain relative clinical facts. In this group there are three types of disease which resemble each other only in certain characteristics, the time of onset, a definite kind of dementia, and certain characteristics relative to reaction and emotional change. In only one of these were there any constant clinical symptoms, and that group was the catatonic dementia præcox. He thought we would never be able to determine the pathogenesis of any of these groups until we studied each separately.

We know that emotions and physical state are correlated and interrelated. Studies of respiratory and circulatory changes accompanying emotion show marked difference between the katatonic and hebephrenic types. Such changes as are relative to the central autonomic nervous system are common in katatonia and rare in hebephrenia. So he thought that until we studied one group of the disease the findings would not be very accurate or scientific. He thought if one allowed his clinical experience to be the basis of his opinion he would often fail. He said he wished to add his great appreciation of Dr. Holmes's work, because this particular investigation was fraught with great difficulty and attended with no thanks. If it could be definitely shown that some form of intoxication was present, whether primary or secondary, it would certainly be of great help.

Dr. Hugh T. Patrick thought there was no question but that the members of the Society all agreed about Dr. Holmes's patience, enthusiasm and courage in going on with his investigation after many disappointments. He thought he showed the true scientific fervor which might almost be called furor, in the best acceptance of the term. But, on Dr. Holmes's own statement of his experience, the thing that impressed Dr. Patrick was that the improvement was in the general health, and that Dr. Holmes made no claim for improvement mentally, so the question at once arose that even if these toxic amines did play a rôle in the disease, they had nothing to do with the mental disorder of the patient, which was by all odds, so far as clinical knowledge goes, the most important thing in the case. He thought the results as shown in the patients certainly showed that they were in excellent physical condition, but on Dr. Holmes's statement of the five cases, one could not help feeling that the results were not so very different from those that might be seen in any five cases of dementia præcox. He said we knew that these cases fluctuated rapidly, that certain ones appeared to get well, and of those who appeared to get well a certain proportion probably did get well, but that there was a high proportion of relapses. In some cases the changes were exceedingly striking, perhaps more so than shown by Dr. Holmes's patients.

Dr. M. J. Hubeny said that when Dr. Holmes asked him to cooperate in this work he was glad to do so. The results of the investigations had been gratifying, because the cases which Dr. Holmes had brought for examination show a retardation of the opaque meal in the progress towards the splenic flexure. There were a number of cases where even after twelve hours the meal was in the cecum and ascending colon and that part of the transverse colon proximal to Cannon's sphincter. There were several other cases in which the same condition existed in which dementia præcox was not present. Another series of cases has been those of idiopathic epilepsy in men of advanced age; that Dr. Hubeny considered interesting and felt as Dr. Holmes did that if it could be the inspiration of any investigation that would permit further study and knowledge, efforts would be worth while. He ex-

hibited a picture of a case where there was a distinct retardation of the food. The picture was taken after six hours. At the first third of the transverse colon there was a very rigid retraction. The fluoroscopic examination verified this even more than shown by the print. He said that in the examination it was possible to see the food passing through in very small amounts, and that this had happened in every case that he had studied with Dr. Holmes.

Dr. Bayard Holmes expressed his thanks to the Society for the reception of his paper and said it was not given with the thought of presenting any great contribution, but for the purpose of putting before them the basis of further investigation. He said if time permitted he would like to explain more fully some particular conditions that had occurred to him as the result of this discussion. He wished that Dr. Koessler could see a few dementia præcox cases with his thoughts concentrated upon the action of histamine upon the bronchial musculature, and he wished he would notice that there was a large number of people who believed that institutionalism alone was not at all responsible for the tremendous number of deaths of dementia præcox cases from tuberculosis. He hoped that in the future he might be able to present something to the Society that would be positive and convincing; not necessarily of the fact the histamine was the primary source of deterioration of dementia præcox patients, but that at least the study of the production of toxic substances in the organism may lead to the solution of this problem.

Dr. Retinger, closing, said he knew that his method was rather crude, and knew that histamine was almost insoluble in ether, but leaning on the physical law of division between two immiscible solvents, on which a commercial method of extraction by chloroform is based, he used, for commodity reasons, ether, knowing that he would be able to extract enough histamine for a qualitative test. Because he always considered the method as requiring refinement, he intends to repeat the work with a quantitative method.

CONJUGAL TABES DORSALIS

By Tom Bentley Throckmorton, M.D.

Owing to the frequency with which it occurs, tabes dorsalis takes the first place among spinal-cord diseases. With the advent of laboratory methods, more or less specific as indices of syphilitic conditions, interest was renewed in the study of this disease. Syphilis undoubtedly plays the all-important rôle as the true etiologic factor. The relationship between syphilis and paresis was first discussed by Esmarch and Jessen in 1857, but it was not until the discovery of the exciting organism, the *Spirochæta pallida*, together with the work of Wassermann and the finding of the organism in the central nervous system of individuals dying from undoubted tabes and paresis, that the causal factor and its relationship to these diseases was conclusively proven. Not every individual who becomes syphilized develops tabes or paresis. Undoubtedly these diseases require for their development some special strain or change in the quality of the syphilitic organism or virus. Syphilis coming in contact with an unstable nervous system (neuropathy) may also have an important bearing on the production of these disorders, and likewise be a factor in their development. Trauma, alcoholism, excesses, over-fatigue and exposure to cold are merely contributory factors.

The frequency with which tabes or paresis is met with, and the relative infrequency of the conjugal type of these diseases, seem to warrant the reporting of such cases whenever found. A white male, 66 years of age, complaining of urinary incontinence, inability to walk properly, and period-

ical attacks of pain involving the trunk and lower extremities was observed late in 1912. Duration some thirteen or fifteen years, worse during the past three or four years. Family history negative. Had Neisserian infection at eighteen, denies lues. At fifty years of age began to have vague pains in legs and chest. Symptoms gradually increased, so that at time of examination all the cardinal clinical findings of a well-marked case of tabes were found. Ataxia of arms and legs, Argyll-Robertson pupil, hyperesthesia of the chest, hypesthesia of lower extremities, absent knee and ankle jerks, urinary incontinence, perforating ulcer of foot, were all present. The blood serum was weakly positive. Died a year later of pneumonia. Postmortem examination revealed typical changes in the dorsal columns of the cord.

The wife's condition is fully as typical as that of the husband. Family history negative. Married at eighteen. Had nine miscarriages and one stillbirth. No evidence of primary or secondary features of syphilis. When fifty-one years of age, began to have vague pains in legs, unsteadiness of gait developed, also had attacks of transient diplopia. Later had vesical and rectal incontinence, a girdle sensation, and ulnar paresthesia. Examination revealed ataxia of lower extremities, Romberg sign, Argyll-Robertson pupil, absent knee and ankle jerks. Serologic test gave a negative Wassermann.

In conclusion, the predilection of syphilis or its products for nervous tissue was taken up, and its selective action between cutaneous and nervous tissues considered. The well-known clinical fact that cases showing little or no secondary features are more prone to develop the late or tertiary manifestations of the disease was explained on embryological grounds. Since cutaneous and nervous tissues are developed from the same primary source, ectoderm, it is not unreasonable to assume that in those cases showing marked secondary or cutaneous manifestations the nervous tissue perhaps is spared from invasion, and vice versa.

Periscope

Monatsschrift für Psychiatrie und Neurologie

Abstracted by Dr. J. W. Moore, Beacon, N. Y.

(Vol. 36, No. 4, October, 1914)

1. Brain Abscess as a Result of a Peripheral Suppuration Following Accident. Kutzinski and Marx.
2. Psychoanalysis in Medico-Legal Relations. J. H. Schultz.
3. Heredity and Physical Degeneration in the Insane and the Mentally Normal. A. S. Scholomowitsch.
4. Paranoic States on a Manic-Depressive Basis. H. Seelert.

1. *Brain Abscess.*—An abscess of the brain developed subsequent to a suppurating condition of a finger which had been injured. The latter had nearly healed. The abscess in the brain occupied nearly the whole frontal lobe.

2. *Psychoanalysis.*—A dissertation on the theories and methods of the Freud school and a discussion of their criticisms, together with a survey of their medico-legal relations. The possibility of misuse of psychoanalysis, the danger of more harm than good coming from the procedure and the opportunities for scandal arising from the intimate character of the conversations necessary are not forgotten. The advisability of legal restrictions upon the practice of psychoanalysis is mentioned, but even its opponents are averse to this. The author concludes that the relationship of psychoanalysis to medico-legal procedures is only indirect. Psychoanalysis, with enthusiastic overestimation of its value on the one hand and narrow-minded criticism on the other eliminated, is a valuable addition to scientific medicine.

3. *Heredity and Physical Degeneration.*—It is pointed out that statistics on the hereditary influences in insanity have been compiled without adequate investigation of healthy normal individuals for control. The author examined systematically 507 insane cases and 499 normal persons. The following points were noted and tabulated as to the antecedents—insanity, organic nervous disorders, alcoholism, tuberculosis and epilepsy. Neuroses, syphilis and trauma were omitted, so that the findings cannot be regarded as representing an investigation of all the important hereditary influences. The author found only 10 per cent. more hereditary taint in the mental cases than in the normal. Insanity in the antecedents, however, was 14.9 per cent. in the insane cases as against 3 per cent. in the normal. Apoplexy and other organic nervous disorders were more frequent (9.2 per cent. to 3.5 per cent.) in the normal than in the insane. Tuberculosis and epilepsy were about as frequent in one as in the other. Physical stigmata of degeneration were so nearly identical in frequency and degree in the insane and normal cases that they cannot be said to have any significance.

4. *Paranoic States.*—An extended history of a case of manic-depressive insanity with persecutory and other paranoic delusions. In a discussion of the diagnosis the greatest emphasis is laid upon the affectivity which was manifest even at first. The patient was predominantly depressed and had a feeling of perplexity alternating with hopelessness.

(No. 5, November, 1914)

1. The Boundaries of the Extremity Regions in the Brain Cortex. M. ROTHMANN.
2. The Presence and Significance of Gland-like Formations in the Cortex. (Spherotrichia.) A. SCHOENFELD.
3. Repetitions of Short Narratives in Cases of Pseudologia Phantastica. F. LIEBENTHAL.
4. Remarks on the Paper, "The Effect of Luminal in Epileptic Dementia" (by W. Grzywo-Dybrowski). FRIEDLAENDER.

1. *Extremity Regions of the Cortex.*—Animal experiments were undertaken to redetermine the motor divisions of the cortex in the light of our newer knowledge of the cell-structures of the cortical substance. Extirpations were done in dogs and apes with results that must change some of our older views and which explain some of the hitherto little-understood phenomena. In the dog, behind the motor area for the extremities mapped out by Munk is a zone for deep sensibility—for the fore-leg in the gyrus suprasylviacus; for the hind-leg in the gyrus marginalis. In apes the supramarginal gyrus to which Munk ascribed visual function belongs to the arm region while the gyrus angularis is associated with vision. Extirpation of the posterior central gyrus alone causes, besides weakness and ataxia, a transitory direction-disorder of the opposite arm. Ablation of the supramarginal gyrus also causes more severe disturbance of the sense of direction and disorder of the skin- and muscle-sense. The inactivity of the opposite arm after extirpation of the post-central gyrus, as well as the restitution of some movements after extirpation of the anterior central, shows the presence of motor elements in the former. In the anterior central gyrus the motor zone extends far anterior to the arm area as determined by electrical reaction. Drawings and photographs illustrate the article.

2. *Gland-like Formations.*—The article deals with the minute formations in the senile cortex which have been investigated by O. Fischer, Alzheimer and others and which have received various names,—"senile plaques," "senile bodies," "gland-like bodies," "spherotrichiæ." The author's material comprises 115 cases—a fairly large number for study by the rather time-consuming Bielschowsky method. The cases were of all ages and all types of psychosis. The plaques were found in twenty-two cases. Of these, eight were cases of presbyophrenia, five had a few presbyophrenic symptoms, two showed simple senile dementia, two had chorea, two had no apparent psychosis and three were under observation too short a time to arrive at a definite diagnosis. The author concludes that the spherotrichia of Fischer is a quite characteristic picture in senile brains, occurring predominantly between the ages of sixty and eighty—never before fifty. They are always found in presbyophrenia but are not, as Fischer has held, pathognomonic of that condition.

3. *Narrative Repetition in Pseudologia Phantastica.*—The investigation was based upon the work of Köppen and Kutzinski whose monograph "Systematische Beobachtungen über die Wiedergabe kleiner Erzählungen bei Geisteskranken" was reviewed in this journal in 1911. The few cases of pseudologia phantastica examined showed a strong tendency to the addition of new sentences to the narrative and to marked distortion of the content while still preserving coherence. The same short tales were used that are given by Köppen and Kutzinski.

4. *Luminal in Epilepsy.*—Friedlaender claims priority in the use of this agent for epilepsy and calls Grzywo-Dybrowski to task for giving the credit, in his article in the last number of the Monatsschrift, to Hauptmann.

(No. 6, December, 1914)

1. Cauda Tumors with the Picture of Ischiadic or Lumbo-sacral Neuralgia. H. Oppenheim.
2. Hereditary Syphilis. M. Rohde.
3. The Fasciculus Corporis Callosi Cruciatus. (Crossed Corpus Callosum—Corona Radiata Bundle.) N. von Mayendorf.
4. Psychiatry in the War. K. Bonhoeffer.
5. Tetany Symptoms During and After Dysentery (from the Neurological Division at the Eastern War Front). M. Löwy.

1. *Cauda Tumor.*—Two cases are described. The first was of seven years' duration when first observed by the author but even then the symptoms were only such as could be produced by a double ischiadic neuritis. The pain was so severe and the patient showed such prostration that affection of the cauda equina was suspected. Lumbar puncture showed enormous increase in albumin but no increased cell content. The color of the fluid was yellow. Operation disclosed a diffuse soft tumor of the dura which proved microscopically to be fibro-sarcoma. It was impossible to remove the mass and the patient died about two months later. The second case had lasted for four years and had presented only symptoms of lumbo-sacral neuralgia. Laminectomy disclosed a large circumscribed benign tumor which was excised and the patient ultimately recovered. The cases show that a protracted neuralgia of the ischiadic or crural region, which resists all treatment and increases in severity, is to be regarded in the light of its possibly being due to a tumor.

2. *Hereditary Syphilis.*—A congenitally syphilitic boy of twelve years died with symptoms of a syphilitic meningeal affection. A diffuse gummatous material was found between the dura and pia and quite sharply defined from these membranes. The process was most marked in the right temporal region. Beside this chronic productive process there was a fresh inflammatory reaction as shown by an extensive round-cell infiltration in and beneath the dura. In the cortical substance itself was found to an enormous extent a degeneration with total loss of all nervous elements. The contour of the brain surface was not changed and the altered structure was a mass of glious tissue. In the depths this tissue took a good glia stain but the stain faded toward the periphery until at the outer margin there was scarcely any color. The author believes the changes were due to a mechanical cause rather than to the luetic toxine—that the pressure on the lymph spaces and blood-vessels by the gummatous meningitis produced an edema of the brain substance with subsequent degeneration. The article is illustrated by colored photomicrographs.

3. *Fasciculus Corporis Callosi Cruciatus.*—In several preparations from a brain in which a great part of the right frontal lobe and right anterior central gyrus were destroyed together with the marrow beneath, the author demonstrates a definite degeneration in the left hemisphere of a tract known as the crossed callosum—corona radiata bundle. Much of the article is taken up with a review of previous literature showing the confusion and misinterpretation which has surrounded this area. The author claims only to show that the tract exists, as it is impossible in a Weigert preparation to trace it further or to allow a surmise as to its destination.

4. *Psychiatry in the War.*—This article, written during the first few months of the war, deals chiefly with the mental disorders developing while the army was mobilizing. Out of 100 officers and men declared incapacitated for this cause 53 were persons of psychopathic constitution. The reason for this is probably that the recruiting brings together many psychopathic individuals who in spite of their abnormality have been able to get along during

times of peace, but who during the excitement and anxiety attending the mobilization show emotional and other disturbances. These persons, even if they are placed in hospitals and recover from their episodes, are prone to become upset again if they return to the front. It is better then to keep them permanently away from the firing line. Several charts are given showing the statistics of various armies as to mental disease. In each army where the country has been at war at any time there is a marked increase in insanity. A striking fact, however, is that the greatest increase comes at the end of the war and during a year or two following. This is due to several circumstances. Probably one important reason is that more careful examination and elimination is possible after the war than during it when there are so many other things of more pressing moment to attend to.

5. *Tetany and Dysentery.*—The author, an Austrian medical officer at the eastern front, observed numerous cases of dysentery accompanied by tetany. The affection did not occur with other forms of illness. Most cases occurred in the fall during the cold, rainy weather. The literature does not appear to show previous reference to the association of these two diseases.

Journal of Mental Science

Abstracted by Dr. W. C. Sandy, Middletown, Conn.

(Vol. LXI, No. 254)

1. Sir Thomas Smith Clouston—Obituary.
2. Study of Character by the Dramatists and Novelists. F. W. Mott.
3. Meningo-vascular Syphilis associated with a Retro-olivary Syndrome. R. M. Stewart.
4. Anger. Theo. B. Hyslop.
5. Catatonic Dementia Præcox. G. Dunlop Robertson.
6. Organization of Research. David Orr.
7. "Amnestic" or "Korsakow's" Syndrome. J. M. Moll.

1. *Sir Thomas Smith Clouston.*—A sketch and estimation of this great administrator and teacher. An asylum superintendent at the age of twenty-three years, he was a "most shining example of the justification of the medical management of institutions for the insane." In his lectures and writings he aimed to elevate psychiatry into an honorable place in the medical curriculum and to remove the stigma attached in the public mind to the incidence of an attack of insanity. His writings and teachings were characterized by a simplicity, a return to which, in the opinion of the writer of this obituary, would result in no small benefit to the specialty.

2. *The Study of Character.*—Mott shows, by references to novelists and dramatists, how well character is delineated and passions exhibited especially in the writings of Shakespeare.

3. *Meningo-vascular Syphilis.*—Stewart records a case of meningo-vascular syphilis with a retro-salivary syndrome, going into the post mortem findings in great detail. Among other lesions were found a thrombus of the left posterior inferior cerebellar artery (that of the right side being apparently absent) and a destructive lesion in the medulla behind the inferior olive, involving fibers of sensation in the formatio reticularis and the descending root of the fifth nerve on the same side. The latter resulted in crossed anesthesia of the syringomyelic type affecting the limbs of the trunk accompanied by anesthesia on the same side of the face. In his analysis of the case, the writer correlates each symptom with its pathological basis.

4. *Anger.*—Hyslop epitomizes his dissertation on "anger" as follows: (1) Anger, as traced throughout the scale of evolution of the animal king-

dom, has served as a stimulus to aggression for the procuring of food, as an aid to survival and as a necessity for the acquirement and maintenance of supremacy. (2) Anger, occurring in mankind, is (phylogenetically) an expression of an atavistic reversion or retrogression and (ontogenetically) also an indication of familial or individual devolution. (3) Anger, clinically considered, ranges in varying degrees of severity, from mere temporary defective inhibition to conditions of suicidal and homicidal impulse of medico-legal and even national importance, as individuals, families or communities, become affected.

The discussion of the third point includes some consideration of different phases of past and present warfare.

5. *Catatonic Type of Dementia Præcox.*—Robertson argues that there is an auto-intoxication in the catatonic form of dementia præcox, arising from an hereditarily transmitted defective biochemism. The hereditary defect is manifest in the neuronic tissues, in youth perhaps latent but later on, more and more obvious in contrast to the normally developing somatic health groups. At puberty, the neuronic weakness is accentuated by the addition of the sexual element resulting in an "affective" strain or tension. This process is accompanied by a "painful" content in which "repressions," "subliminations" and so forth will occur. The latter are unconscious, the physiological outlet for which is the sympathetic nervous system. The chromaffin cells, developmentally closely associated in origin with the sympathetic nerve cells, will feel the hereditary biological handicap almost, if not quite, as severely as the neuronic. The resulting "irritability" of weakness is a hypersecretion through stimulation of the sympathetic nerves which in the case of chromaffin cells is adrenalin. The latter is a vaso-constriction caused by excessive secretion of adrenalin. In catatonia there is a cerebral and general somatic toxemia induced by greater excess of adrenalin output. A qualitative test of catatonic dementia præcox blood serum for adrenalin is affirmative, and there is also found quantitatively an excess of adrenalin.

6. *The Organization of Research.*—After calling attention to some of the achievements of research workers and the multiplicity of problems still awaiting solution, Orr defines some of the essentials of organization. There must be a central laboratory with a competent director and staff, comprising a teaching body, connected with a reception house, clinic or out-patient department. The latter is a necessary supplement to the "asylum" in order that patients may be received for early diagnosis and treatment. Besides the central laboratory, to which all may come for assistance and instruction, each asylum must have its own pathological laboratory.

7. *"Amnestic" or "Korsakow's" Syndrome.*—Moll presents a discussion of the symptomatology, diagnosis, course, prognosis and treatment of Korsakow's psychosis of alcoholic origin, giving an analysis of thirty cases. Three of his patients died, sixteen were actually discharged, seven became normal, three showed a slight, eight a moderate and nine a grave defect.

(Vol. LXI, No. 255)

This is the first number of the Journal of Mental Science to show to any marked degree the effects of the war. It consists of twenty-two pages, there being no original articles but only an "apologia" from the editors. In this, the attention is called to the fact that 180 members of the medical staffs and some 3,000 of the employees of the asylums of the British Isles have joined one or other of the services. "The flow of contributions has been abruptly checked. Those of our asylum colleagues who are still in charge have more than enough to occupy them in purely administrative work."

Neurologisches Centralblatt

ABSTRACTED BY DR. LOUIS POLLOCK, CHICAGO, ILL.

(July 1, 1912, No. 13, Vol. 31)

1. An Investigation into the Explanation of the Hysterical Predisposition. MÜLLER DE LA FUENTE.
2. Hysterical Phenomena in the Early Stage of Organic Disease of the Nervous System. KARL HUDOVERNIG.
3. A Case of Hysteria and the Nervous Origin of Secretion Anomalies. HEINICKE.

1. *Hysterical Predisposition.*—In an article not very well adapted for abstracting de la Fuente discusses the predisposition to hysteria and states that the psychical inferiority which is demonstrated in individuals predisposed to hysteria may be divided into two groups; namely, psychical infantilism and psychical exaltation. As the first group signifies, he includes as components of this childish habitus the desire to shroud natural occurrences with an unnatural veil, or the self-satisfaction to explain things lying somewhat above human understanding, the striving for the depths of understanding, absence of the ability of logical decision, belief in wonders, in mysticism, etc. Very characteristic of this group is the childish selfishness and the desire of cheap triumphs. Judgment is missing or very little developed. The second group includes individuals who are inclined to be governed by certain views and prejudices which form the center of the whole mind of the individual and govern it more or less. They refuse to be enlightened or to obtain any better insight into conditions which may be but partly known by them. He considers that the clinical description of hysteria coincides with his description of psychical infantilism, and holds that the main symptoms of hysteria which present themselves in numerous variations and combinations are built upon a foundation of infantilism.

2. *Hysterical Phenomena in Organic Disease.*—Hudovernig reports two cases of multiple sclerosis which began with an initial neurosis of a hysterical type. He reports a case of tabes with marked symptoms of neurasthenia which, as the tabetic symptoms made their appearance, became less and less prominent and finally disappeared. He further reports two cases which showed hysterical phenomena several years before the outbreak of dementia præcox. He states that such hysterical phenomena occur as a result of an inborn debility of the nervous system, or the occurrence of a secondary disease or both.

3. *Hysteria and Secretory Changes.*—Heinicke reports a case of a secretion anomaly of functional nervous origin. He calls attention to the fact that these disturbances are not rare; for instance, the hysterical polyuria and anuria, disturbances in sweat secretion, nervous salivation and running of the nose. His report deals with a typical case of hysteria as described by the French where there was present swelling of the breasts and a painful galaktorrhea.

(August 1, 1915, No. 15, Vol. 34)

1. Late Abscesses Following Gunshot Wounds of the Brain. OTTO MARBURG and EGON RANZI.
2. Some Observations of Gunshot Wounds in the Vertebræ and Spinal Cord. ARTUR STERN.
3. Gunshot Wounds of the Peripheral Nerves. A. BITTORF.

1. *Abscesses and Gunshot Wounds.*—Marburg and Ranzi discuss their observations of a considerable number of cases included in a series of sixty-

two cases which were operated upon, of the occurrence of sudden marked clinical symptoms in apparently recovered cases. They group these cases according to the conception that late abscesses occur a few months—four to five—following the first operation, and manifest themselves without any apparent cause. They make their appearance with headache, vomiting, rise of temperature and within twenty-four hours irritative phenomena, such as stiff neck, Kernig sign, slow pulse, and general prostration. Death comes on quickly, without any suitable explanation upon anatomical grounds. Localizing symptoms also appear, such as hemiplegias and aphasias.

They assume that the symptoms result from the spread of the pus into the ventricles, causing a pyocephalus, then throughout the foramen Magendi to the meninges at the base of the brain and from there to the hemispheres. In every case of gunshot wound, observations must be continued for a number of months and with the appearance of the rise in temperature if pus is found in the cerebrospinal fluid the condition must again be treated surgically.

2. *Gunshot Wounds in the Spinal Cord.*—Artur Stern describes a case of a Brown-Séquard paralysis occurring as the result of an injury about the first and second dorsal vertebræ, the clinical condition coinciding with the Roentgenological findings. He further describes a case of a man injured by a grenade splinter on the left side of the neck in which there appeared a ptosis of the left side with a narrowing of the pupil and slight enophthalmos, differences in the temperature of both sides of the face and pronounced anidrosis of the left side. It is unusual that such a splinter should have injured the sympathetic so largely and avoided the big blood vessels of the neck.

He reports another man with an injury of the sympathetic system of the neck who presented Horner's symptom complex with involvement of the right vagus and hypoglossal nerves. He reports another case of injury with a grenade splinter causing a herpes zoster at the level of the first and second lumbar vertebræ in which the splinter was localized in the intervertebral space between the eleventh and twelfth dorsal vertebræ. In a second similar case a splinter located under the border of the first right lumbar vertebra was followed by a herpes. These two cases, he thinks, speak for the possibility of a traumatic inflammatory cause of herpes zoster.

3. *Peripheral Nerve Injuries.*—Bittdorf divides gunshot wounds of the peripheral nerves into two groups which differ in their localization, symptomatology and prognosis. The first, larger group manifests itself most frequently in the radial nerve and brachial plexus in the upper extremity and in the ischiatic nerve in the lower. In these injuries the motor symptoms are pronounced and the sensory disturbances either are absent or fall into the background. The prognosis of the motor symptoms is unsatisfactory and at the best recovery is slow. The second, smaller group concern those cases where sensory, vasomotor, secretory and trophic changes are in the foreground. These occur chiefly as the result of injury to the median nerve. Prognosis in these cases, even without operation, is much better than in the former. He states that the association of vasomotor and sensory disturbances are observed in the peripheral nerves just as in spinal cord diseases, and calls particular attention to the relation which temperature and pain senses bear to vasomotor paralysis and trophic disturbances.

(September 16, 1915, No. 18, Vol. 34)

1. In memory of Max Rothmann. H. Oppenheim.
2. Investigations of Adrenalin Mydriasis in Insanity and Normal People. W. M. van der Scheer.

2. *Adrenalin Mydriasis.*—van der Scheer concludes from an investigation conducted on 172 people that:

1. Anisokoria occurs in normal individuals far oftener than has hitherto been recognized, whereas the percentage of various investigators fell between 2.6 per cent. (Bach) and 24 per cent. (Reichman) he finds it present in 40 per cent. of cases. This is not immediately very obvious but with continued and various examinations it may be brought out.

2. Adrenalin mydriasis occurs in 34.5 per cent. of normal individuals. The mydriasis is frequently not very marked, but evident, frequently occurring after a rather longer period—one half, one to one and a half hours. Seldom one may find adrenalin myosis.

3. Adrenalin mydriasis occurs in the various psychoses in a percentage slightly higher than that in the normal. In certain cases—namely, katatonia and epilepsia, it is very marked and lasts for a long time.

4. Adrenalin mydriasis has no practical significance as to differential diagnosis between functional and organic psychoses.

Review of Neurology and Psychiatry

Abstracted by Dr. C. E. Atwood, New York

(Vol. XIII, No. 7)

1. A Case of Myotonia Atrophica with a Family History of Cataracts, but no History of Familial Myopathy, and no Myotonic Manifestations. E. G. Fearnsides.
2. A Crossed Reflex in Diphtheria, Elicited by Stimulation of the Quadriceps Femoris Muscle. E. B. Gunson.
3. Pellegra. R. Dods Brown.

1. *A Case of Myotonia Atrophica.*—The diagnosis is based largely on the distribution of the muscular wasting and the history of familial cataracts. It is stated that myasthenic symptoms could not be demonstrated and the myasthenic reaction was not observed. The family history of the patient, a woman, is as follows:

Her paternal grandfather and grandmother were cousins, and a great-grandfather and great-grandmother on the father's side were also cousins. Her paternal grandmother, at the age of 40, developed cataracts in both eyes. Her father and mother were normal. A paternal uncle and paternal aunt, both of whom died unmarried, developed cataracts before the age of 40. A paternal aunt and two of her children, all of whom I have seen, developed cataracts between the ages of 20 and 38, and at the present time show no evidence of myopathy. The patient herself was one of two children, but by her mother has two older half-sisters, who are completely normal, and her own sister shows neither myopathy nor cataracts. As far as can be ascertained, there is no other family history of nervous or muscular disease.

Personally, she had good health until the age of 31, when she developed cataracts which were removed. At 32 or 33 her neck muscles became suddenly weak and thereafter progressively weaker. At 36 she experienced difficulty in walking. At 44 her trunk muscles were so greatly involved she was unable to rise from a chair. Under hospital treatment she gained weight and assumed a healthy appearance.

The distribution of the muscular wasting is myopathic in type. The muscles chiefly involved are the sternomastoids, trapezii, deep muscles of the neck, serratus magnus, latissimus dorsi, supraspinati, glutei, vasti and anterior tibial muscles, and to a less extent the muscles of the forearms. The cheek muscles are certainly involved, and the facial muscles are also slightly affected. This distribution of atrophy is similar to that seen in cases of myotonia atrophica, except that the deep muscles of the neck are more atrophic than they have been in any case of myotonia atrophica recorded.

The frequent association of familial and hereditary cataracts with muscular wasting amongst the myopathies only occurs in myotonia atrophica. Greenfield (1) first recorded this association; in the family recorded by him, seven cases of cataract and four of myopathy occurred in three generations. Hoffmann (2) in 1912 analyzed the cases of myotonia atrophica recorded in the literature up to that date, and found that in 10 per cent. (eight out of eighty) of cases of myotonia atrophica this association had occurred. He noted that they were families in which some members showed cataract without myotonia atrophica, others myotonia atrophica without cataract, and still others both myotonia atrophica and cataract. This association of myotonia atrophica and cataract has also been recorded by Ormond (3), Obendorf and Kennedy (4), Tetzner (5), Hirschfeld (6), Fearnsides (7), Bramwell and Addis (8), and seems to form additional ground for classifying this case amongst those of myotonia atrophica.

2. *A Crossed Reflex in Diphtheria.*—A reflex movement of flexion at the hip joint and extension of the great toe, induced by stimulation of the quadriceps femoris muscle mass of the opposite limb, was originally described by the writer in a case of cerebral tumor.

The present paper deals with the reflex in diphtheria. Twenty-five consecutive cases of faucial diphtheria, in which the diagnosis was confirmed bacteriologically, were investigated during periods varying from five to fourteen weeks, depending upon the length of stay in hospital. The patients included male and female, and the ages ranged from three to eight years.

The crossed reflex described was found in 76 per cent. of cases, and was accompanied by pain, referred to the site of stimulation. In half the cases the reflex was incomplete, and consisted only of extension of the great toe. This reflex would seem to point to involvement of the spinal cord in a larger proportion of cases than is generally recognized, and it suggests that the motor weakness, ataxia, and loss of knee jerks may be largely dependent upon a central lesion of a toxic or inflammatory nature.

3. *Pellagra.*—This disease has a very wide distribution. It occurs in Europe, especially in Italy, southern France, Spain, Portugal, Roumania, the Balkan States, Austria-Hungary, Russia, and Turkey. It is present in Asia Minor and India. It is rapidly spreading in Egypt, and it is known to exist in Algeria, Tunis, and southern Africa. It is found in South America as well as in forty of the United States.

Thirteen theories of causation of pellagra are mentioned and all objected to. The theory which has the largest support is that elaborated by Lombroso. He maintains that pellagra is the result of the ingestion of damaged maize, in which is found a substance which he called pellagrozein. He considers that his views were strengthened by experimental work, *e. g.*, the feeding of animals, etc. Many observers, however, have failed to corroborate Lombroso's work.

The writer's clinical description of the disease includes, among alimentary symptoms, the familiar "bald tongue," liquid stools and tract inflammatory conditions; among cutaneous symptoms, the early erythema and later dermatitis, most frequent on exposed surfaces.

Nervous Symptoms.—Pain in the lower dorsal or lumbar region, hyperesthesia at each side of the spinal column and in other parts of the body, humming noises in the ears, and sleeplessness. There is muscular weakness, with inability to stand or walk in severe cases, spasticity of the legs, with increased knee jerks, followed by loss of this reflex. Babinski's sign is sometimes obtained. There may be vertigo, fine tremors, or epileptiform convulsions, with or without loss of consciousness. Muratori describes a gustatory aura as occurring in one case. Nystagmus, photophobia, diplopia, optic neuritis, and optic atrophy have been described as occurring in some cases.

Mental Symptoms.—It is stated that from 5 to 10 per cent. of pellagrins in Italy develop insanity, while in America the majority of cases have been observed in asylums. With regard to Egypt, Warnock states in his report for 1913 that "pellagra has now become the greatest cause of insanity in Egypt, and of deaths among the insane. It accounts for over 17 per cent. of the admissions, and one third of the deaths in the asylum." Nearly all the cases recorded in this country have been patients in mental hospitals. It is important to differentiate between insane people who develop pellagra and those who are insane as a result of this disease. Most authorities are agreed that it is merely an exciting cause of well recognized forms of mental disorder, but some believe that pellagrous insanity has its own special characteristic symptoms. The chief types are best classified as mental depression, acute confusion, and dementia, which may be of the præcox or senile form. Of the three patients in Scotland, which I have seen, two were suffering from melancholia, with considerable apprehension and agitation, and one was a case of acute confusion, with auditory and visual hallucinations and disorientation.

The confusional type of mental disturbance tends to occur early in the disease, and it may be recovered from.

It is said that the pellagrous melancholic usually exhibits a slight degree of confusion and suspicion.

Sometimes the psychosis is pseudo-progressive paralytic in character, and a pseudo-tabetic form has occasionally been described.

The prognosis is very bad in acute "typhoid pellagra." Those patients who suffer from one or two mild attacks may recover. Those who do not recover may live for many years with recurrences every spring. Cachexia and dementia may develop.

For treatment arsenic in full doses seems to give the best results.

Pathologically, wasting of subcutaneous and muscular tissues is found, and the heart, liver, kidneys and spleen show fatty degeneration sometimes accompanied by a pigmentary deposit. Stomach and intestines may be inflamed. Ulcers may be found in the bowel.

Mott found no evidence of meningo-encephalitis or meningo-myelitis. Degenerated fibers were present in the sciatic nerves and in the cauda equina, while in the cord the crossed and direct pyramidal tracts and the tracts of Gowers and Goll showed slight general diffuse sclerosis. In the cells of the posterior spinal ganglia, and of Clarke's column, marked chromatolysis was present. Degeneration in varying degrees was observed in the cells of the anterior horn and in those of the pons and medulla. Less marked changes were seen in the Betz cells of the cortex, and also in Purkinje's cells, while the cortical pyramidal cells did not appear to be markedly affected. Mott considers that these pathological findings contraindicate the protozoan theory of the origin of pellagra, although they do not altogether disprove it.

Kinnier Wilson, from an examination of thirteen cases, believes that the pathological findings are those of a widespread generalized toxemia of the peripheral and central nervous system. He considers that the toxin may be of alimentary origin, which, getting into the lymph stream, invades the cord along the posterior nerve roots.

(Vol. XIII, No. 8)

1. The Mental Symptoms in Disseminated Sclerosis. D. Maxwell Ross.
2. Extensive Occlusion of Cerebral Arteries in Diphtheria. J. D. Rolleston and E. B. Gunson.

1. *Mental Symptoms in Disseminated Sclerosis.*—Five cases occurring among 750 patients in the Royal Edinburgh Mental Hospital are described,

rather briefly. The first case presented a marked disturbance of the emotions, accompanied by some intellectual enfeeblement, with a lack of real insight into her condition; the whole state suggesting the excited phase of manic-depressive insanity occurring in an enfeebled person. The second patient suffered from a typical attack of acute delirious insanity, presenting no features not usually found in the disease and has now passed into an almost stuporous condition in which she is entirely mute and apathetic.

In case three the onset of the disseminated sclerosis in 1910 was associated with a change in the degree of mental symptoms. Her delusions and suspicions gradually became less prominent, and her periods of mild depression and irritability less marked. She presented, however, in place of this, a progressive though slight enfeeblement, and a characteristic feeling of happiness quite disproportionate to her physical condition.

In summary, case four presents the memory defects characteristic of Korsakow's syndrome, marked mental degradation, and emotional instability.

The history of the last patient seems to point to his having suffered from paranoia, the onset of which was associated with a state of depression. Following his discharge in 1885, he had a period of excessive alcoholism, and was readmitted in a state somewhat suggestive of Korsakow's syndrome. His physical condition under treatment must have greatly improved, but he probably never quite returned to normal health, and it is hard to say from the notes at their disposal exactly when the symptoms indicative of disseminated sclerosis first made their appearance. His mental state does not appear to have been affected by the physical condition, beyond the fact that he has developed delusions which center on the tremors from which he suffers. He shows no emotional peculiarity except his irritability, and presents only a very slight degree of enfeeblement.

If the symptoms presented by this series of cases, and those described by other writers, be summarized, there are two which may be looked on as characteristic of the condition. These are an enfeeblement of the intellect as a whole, and a disturbance of the emotions. The former is usually of slight degree, and is very slowly progressive. The latter consists most frequently of a more or less marked euphoria, less commonly of depression or of irritability, all three states being associated with considerable variability in the moods.

In addition to these symptoms there are found, not infrequently, fleeting variable delusions, impairment of the memory, and acute delirious episodes presenting the typical hallucinations, fleeting delusions, and confusion of that state. In a few cases paranoid ideas develop.

One is therefore justified in concluding that mental symptoms, when present in disseminated sclerosis, are at least sufficiently characteristic to be of valuable aid to the clinician in making a differential diagnosis.

2. *Cerebral Arteries in Diphtheria.*—The patient was a girl of 8, with severe faucial and nasal diphtheria. Sixteen thousand units of antitoxin were administered, followed the next day by 16,000 more. The urine was albuminous. The heart began to show right dilatation and weakness of first sound. On the ninth day of the diphtheria (the sixth after admission), the voice became nasal and the child vomited once. Three days later a triple cardiac rhythm began and persisted. Some days later bilateral paralysis with rigidity and spasm, sudden rise of temperature and Cheyne-Stokes breathing supervened. Vomiting and tachycardia persisted. The left conjunctival reflex was present while the right was lost.

The necropsy showed a clot entirely filling the basilar artery, and to a greater or less extent occluding all the arteries entering into the formation of the circle of Willis, viz., the posterior cerebral, posterior communicating, internal carotid, middle cerebral, and anterior cerebral arteries. The occlusion was much more marked on the right than on the left side.

On examination of the heart both ventricles were found to be dilated and filled with blood-clot, some of which, especially in the left ventricle, was of ante-mortem formation. A recent small infarct was found in the left kidney. The other organs presented no obvious naked-eye changes.

The authors remark that occlusion of cerebral arteries in diphtheria in all previously reported cases has been associated with hemiplegia, and is usually the result of embolism. An analysis of 80 cases of diphtheritic hemiplegia recently collected by one of them (J. D. R.) showed that out of 18 in which a necropsy had been held, embolism had been found in 13, thrombosis in 3, hemorrhage in 1, and sclerotic atrophy in 1. Embolism therefore appears to be the most common lesion in diphtheritic hemiplegia.

In the present case, the enlargement of the heart noticed during life, the existence of an ante-mortem clot found at the autopsy, and the presence of an infarct elsewhere are in favor of embolism. The very extensive nature of the clot renders it probable that a small primary embolus was followed by more considerable local thrombosis.

We have therefore adopted the more general and non-committal term of "occlusion," rather than "thrombosis" or "embolism," in the title of our paper.

MISCELLANY

THE AUTONOMIC SYSTEM. W. Timme. (Journal A. M. A., Jan. 23, 1915.)

The author describes the anatomic features of what has been called by Langley and the English school "the autonomic system." There is some confusion, he says, in the nomenclature; the term vegetative is used for the same system by the Viennese school. The entire autonomic system is divided into various parts, depending on its cells of origin of its nerve fibers in the cerebrospinal axis, which are found in definite areas of the brain and cord. Corresponding with these areas, we have the following divisions: "(1) Midbrain autonomic division consisting of the cells with their axons, which emerge from beneath the superior corpora quadrigemina, supplying the iris and ciliary muscles. (2) Bulbar autonomic, of which the fibers emerge from beneath the floor of the fourth ventricle to pass out with the seventh nerve, nervus intermedius, ninth and tenth nerves, to supply the vessels and glands of the mouth, pharynx, nose, esophagus, stomach, small intestine, part of large intestine, trachea, and lungs. (3) Thoracic autonomic, or sympathetic system proper, arising from the sympathetic cells of the lateral portion of the anterior horns of the spinal cord from the first thoracic to the fourth lumbar segments and passing out by the white rami to the gangliated cord and its connections to supply the skin, arteries, muscles, glands, abdominal viscera, and internal generative organs. (4) Sacral autonomic, leaving the cord from the first to the third sacral segments as the pelvic nerve, to the ganglia of the anus, rectum, descending colon, bladder, urethra, and external genitals." Fibers pass from the brain to the ganglia in which the terminal arborizations of each fibral branch are connected with a cell and no more than one. These are known as the preganglionic fibers, and the axons arising from the ganglionic cells pass to the peripheral end organs, and never join to other cells of the same system. There are no commissural fibers in the autonomic system. These secondary fibers are called postganglionic. There are two great ganglionic cords, one on each side of the vertebral column, from the base of the skull to the coccyx. These are ganglia known as the vertebral ganglia, and are connected with the spinal nerves by the rami communicantes. The white rami communicantes are composed largely of fine medullated fibers passing from the spinal nerve of the first thoracic to the fourth lumbar segment of the cord. The gray ramus, on the

other hand, is composed mainly of pale non-medullated fibers passing from the gangliated cord to all the spinal nerves. The sacral vascular nerves correspond to the white rami, as do also those of the craniobulbar division, that of the vagus. These are local in their supply, whereas the thoracic autonomic, or sympathetic proper, is almost universal. Each of the first two has its areas of control distinct from the other anatomically, while the sympathetic supplies fibers to all the structures so that the tissues supplied by the craniobulbar and sacral autonomic have a double innervation. If the two kinds of nerves produce unlike effects, the central strands of one system are opposed to the other. Timme uses the amphioxus as illustrating the development of the systems in all vertebrates, and the cat as illustrating the conditions in the higher mammals. In this connection, he mentions experiments made by him in tying off the vagus, which gave the unexpected finding of great increase in both length and caliber of the colon and rectum in consequence. It is a fair inference, therefore, he says, that any inhibition exerted by the brain on the vagus nerve impulses to diminish and intensify causes profound effects on the vegetative life of the cells of the alimentary canal. The close connection existing between the primitive neural canal of the amphioxus and the posterior and of the archenteron has apparently its counterpart in the highest developed organic structure of the higher class mammalia, and this, Timme says, shows that cerebral activities that depress the nerves cause physiologic effects on the intestine that are readily understandable by this discovery. The viscera generally having double nerve supply, one from the sympathetic and the other from one or the other of the autonomic divisions, there are effects on the viscera of a balancing character, and the activity of the organ is commensurate with the work required of it. If one set is entirely disconnected, instead of being merely tied off as in the experiment cited, the other, having no physiologic antagonist, ceases its influence. Conditions can be produced comparable to these experimental effects, by the action of drugs. Certain groups of poisons have been demonstrated by the workers of the Viennese school to have selective effects on the end organs of either one or the other system. The one that stimulates the one, depresses the other, as is shown in the case of pilocarpin, a stimulus to these nerve ends, which atropin depresses. Many attempts have been made to trace anatomically the route of influences from the cortex to the bulbar and spinal sympathetic nuclei, and the afferent impulses from the viscera to the cortex. All we know, at present, however, is that there are certain areas in the brain whose stimulation produces certain activities in the viscera, like the dilation of the pupil from irritation of a point in the hypothalamic region and the center in the fourth ventricle, which partially controls the sugar tolerance. We only know that these conductions go through the sympathetic and autonomic fibers. Müller believes there is the same possibility of changes occurring in the excitability of the medulla and cord as occur with the changes and mood in the psychic centers. The manner of conductions of painful impulses from the viscera to the cortex is explained by many as due to the process of "irradition" from the termination of the afferent autonomic fiber in the spinal ganglion to the spinal afferent nerve and thence to the cortex. From all this, the study of the embryologic development directly observed physiologic and pathologic experiments, and pharmacologic experiments, we see that there is a close relationship between the activity of the brain and that of the viscera, and that each is complementary to the other in a broad sense, and depends on it for its own normally functionating existence.

Unrecognized Tabes. J. W. Nuzum. (Journal A. M. A., Feb. 12, 1916.)

The author has studied the records of the Cook County Hospital with special reference to this possibility. In the five years from 1910 to 1915 over

1,000 cases of tabes had been carefully studied and the records examined to determine the relative frequency of the cardinal symptoms, the number of patients operated on, the frequency of gastric crises, etc. In estimating the number of operations only those cases in which nothing wrong was found and the old symptoms have returned after the operation are included as of the kind here discussed. It is clear, he says, that the mistake is not confined to only one locality, and it was found in the study that such operations are fewer in the larger hospitals than in the smaller ones throughout the United States. He has obtained records of 97 operations performed on 87 patients. There were 19 operations on 18 patients for gastric ulcer; 19 operations on 16 patients for gallbladder disease; 18 operations on 17 patients for appendicitis. Eleven patients were operated on 13 times for salpingitis; on 9 patients an exploratory laparotomy was made; 7 operations were performed on 6 patients for renal calculi; 7 operations on 5 patients for postoperative adhesions, and one operation for each of the following: tumor of cauda equina, sciatica, meningocele, ectopic gestation, and peritonitis. Charts were given of the relative frequency of the important symptoms in 1,000 patients and of the symptoms in the 87 patients operated on. These indicate that the crises of tabes must have largely influenced the decision to operate. Summaries of case histories are given of several patients and it appears from the charts that the mistaken diagnosis and resulting operations were chiefly in two groups of patients: (1) Tabetics in whom the initial symptoms were the visceral crises and less frequently those with renal or intestinal crises. (2) Tabetics as a class designated by Erb as "tabes incompleta" or "formes frustes" by the French. These present fewer of the characteristic symptoms and mistakes are less surprising. The possibility of bona fide abdominal disease occurring in paretics must be kept in mind, and a case illustrating this is given. Nuzum mentions a recently found symptom very valuable for the early diagnosis of tabes in the marked lymphocytosis in the spinal fluid. A more careful examination and general suspicion of tabes will, he thinks, spare more needless operations in the future.

Poliomyelitis in Lancashire and Westmoreland. H. A. Macewen. (Local Government Board. 98. London.)

During the summer and autumn of 1913 an epidemic of poliomyelitis occurred in the almost detached part of Lancashire lying to the northwest of the county, and in the neighboring part of Westmoreland. At the end of the year Macewen investigated the epidemic on behalf of the Local Government Board, and his report has recently been published. Between the end of March and the beginning of November there were at least 56 cases of the disease, with 11 deaths; there were 30 cases and 9 deaths in Barrow-in-Furness, with a population of some 65,000. The onset of the disease was often described as resembling that of influenza or a bad cold; headache, vomiting, and drowsiness were not rare, and one case was definitely of the abortive type. After investigating the circumstances of the epidemic, Macewen comes to conclusions that are for the most part negative. Maps of the affected area are given, and show little evidence of any direct continuity of spread of the poliomyelitis. It is true that the cases mainly arranged themselves into four fairly definite, localized, geographical groups, but there is nothing to show that the disease spread from case to case in its neighborhood. It was apparent that the milk supply could not be the vehicle of infection, nor could the food; most of the victims at Barrow were children under school age, and it was impossible, apparently, to attribute the epidemic in any way to school infection. As for insect bites, there was no reason to suppose that they could have conveyed the virus of poliomyelitis; on the other hand, house-flies, encouraged by the method employed locally for the

disposal of house refuse, were very abundant in Barrow during the time of the epidemic. No similar disorder was noted in the domestic animals or pets. A severe outbreak of so-called influenza, however, did occur in the town during the spring of 1913. Consideration of the question of poliomyelitis carriers showed a few instances in which the patient, or some person coming in contact with the patient, may have transmitted the infection to others. But against all theories of the personal carriage of infection is the striking fact that there was not a single example of multiple cases in the same house in the whole of the 56 instances of poliomyelitis investigated; yet there were 139 persons, brothers and sisters of the patients, only 7 of them aged 18 and over, living in the houses where cases occurred. It seems difficult to reconcile the supposition that the disease had been spread by direct or indirect personal contact with this fact, unless, indeed, it is assumed that the total number of persons susceptible to the virus of poliomyelitis is very limited indeed.

Cerebrospinal Syphilis. George Draper. (Journal A. M. A., Feb. 5, 1916.)

The author attempts to present the relationship between the discomforts from the intravenous and intraspinal treatment and the results in terms of the individual's increased or restored economic value to the community. His material for the study has been thirty-eight patients observed for periods varying from three months to three years and of different clinical types. The usual technic was employed, the doses spaced according to the case. A table is given showing the different kinds of reactions met with and their relative frequency. The most frequent is the so-called anaphylactoid phenomenon, appearing as a slight flushing of the face, urticaria or more severe shock. This appeared in about 55 per cent. of all the cases at one time or another, but in the total of 1,126 injections its incidence is about 73, or 6.5 per cent. The disturbance may be prevented to a certain extent by a very slow administration of the drug, and while usually trivial it may be serious, and in one case artificial respiration was required. The other kinds of reaction are more infrequent, gastro-intestinal upsets being the commonest. Under discomforts are classed a number of symptom reactions varying from slight intensity to severe wracking pains. There are several types, some of them, as in tabes, an aggravation of the usual pains of the disease. Another type presents the symptoms of meningism and in one case coma occurred. The details of the symptoms are too numerous to be given in a brief abstract. As regards the benefits derived, a table is given as to the results in persons suffering from neurasthenic conditions, as well as with general physical debility, and which were relieved in a large proportion of cases to a greater or lesser extent. The true paretic is apparently not helped, though patients are designated as such apparently by their response to treatment. Summarizing his article, Draper says: "The purpose of the paper has been to show the number and severity of undesirable reactions to treatment, on the one hand, and the results in terms of working capacity, on the other. The severest reaction to intravenous injections is of the anaphylactic type. The most frequent reaction to the intraspinal injections is pain. The severest is an aseptic meningitis, which may be anaphylactic in origin. Twenty-six patients out of a total of thirty-eight were economically useless before treatment. After treatment twenty-two were back on full-time work. Rapidity and degree of improvement depend directly on this intensity of treatment. It is important to keep patients at work during the months of treatment."

A Clinical Consideration of Migraine. John A. Litchy. (International Clinics, Dec., 1917.)

Migraine is considered by the author as the most frequent headache, occurring in 700 of his 15,000 patients sick from all causes. He believes that

the so-called acidosis in children may often be a forerunner of a well-established sick headache habit. The interesting relation between migraine and epilepsy deserves further study. Among the author's 15,000 patients epilepsy occurred in 7, and both migraine and epilepsy in 70. Auerbach's theory, which attributes migraine to an actual disproportion between skull-capacity and volume of brain, needs further proof. Dr. Litchy shows that the diagnosis is easy when there are headaches which are unilateral, periodical and hereditary, but when only one or two of these symptoms are present, or when there is only a periodicity of some of the minor symptoms or possibly of the auræ, the diagnosis may be difficult. Migraine is frequently mistaken for pelvic disease, for acidosis or cyclical vomiting in children, and organic disease, when some of the auræ are present. The psychasthenic and the gastric symptoms frequently lead to confusion in diagnosis. While the underlying causes of migraine are vague and furnish little light as to treatment, much can be done to ameliorate the symptoms by proper handling of the exciting causes that aggravate the patient's general condition and precipitate the attacks. Most thorough investigation and careful individualization are indicated. Systematic administration of the bromide salts and avoidance of undue fatigue are especially recommended.

Acute Syphilitic Meningitis. Boris Bronstein. (International Clinics, Dec., 1917.)

Bronstein considers that the term acute syphilitic meningitis should be more particularly applied to acute meningeal phenomena of the secondary period, sometimes preceding, but more frequently accompanying the cutaneous manifestations of this period. The pathology is essentially a meningovascularitis with hypersecretion of the cerebrospinal fluid. Prodromal symptoms, such as headache and insomnia, may or may not occur. Acute syphilitic meningitis at its height, as Bronstein says in the December International Clinics, presents the clinical picture of the tubercular form, differing from the latter by the indistinctness of the symptoms, such as contractures and stiffness of the neck, and by the absence of any marked disturbance of the pulse and respiration. In the luetic form fever is apt to be absent and there may be remissions and relapses. Lumbar puncture reveals a considerable hypertension of the cerebrospinal fluid, albumin in quantity, and a marked lymphocytosis with plasmazellen. The cerebrospinal fluid may yield a positive Wassermann even when the blood serum is negative. Other manifestations of syphilis are to be looked for. The immediate prognosis is rarely fatal but the ultimate prognosis should be reserved. Prophylactic treatment is recommended whenever the cerebrospinal fluid shows a lymphocytosis, even when all meningeal symptoms are wanting. The treatment consists in frequently repeated removal of the cerebrospinal fluid in considerable amount, combined with intravenous injection of cyanide of mercury and intraspinal injections of colloidal mercury. Neosalvarsan or salvarsan have a much more rapid action, but must be prudently handled in neurologic lesions of syphilis.

Book Reviews

Psychonévroses de Guerre. Par G. Roussy et J. LHermitte. Précis de Médecine et de Chirurgie de Guerre. Masson et Cie, Éditeurs, 1917.

It would seem that something new of interpretative value might find its way into the literature of the psychoneuroses of the war. Such suggests itself as the promise of this book. The authors' recognition of the ability of the men to react upon the firing line to violently adverse conditions as contrasted with the failure to withstand the after effects when returned to the rear, in hospital or in camp, seemed to promise some revelation of the deeper psychic reactions at work.

These hints of something new to be revealed from the fruitful field of war conditions are however lost in a mass of descriptive detail, which only follows long accepted formulas of diagnosis and method of approach. It is true that the symptoms and manifestations thus reviewed are multiplied and exaggerated by the exigencies of war and thereby offer much material for observation and investigation. Just here therefore the reader expects enlightenment and quickened understanding to follow. Here under these exceptional conditions this branch of medical practice should be able to enter in an unusual way into the study of human reactions and ability or inability to adjust to the demands even of such an environment, in which health or sickness lie. Here there should be unmistakable opportunity for a penetrative appreciation of an individual energy in a grapple with a difficult environment and revealing the strength or weakness which make up nervous and psychical adaptation or failure. This should then be the opportunity for a therapy which receives to itself a wealth of interpretation while applying its understanding to these problems.

There is some approach to this in the value laid upon the personal factor and the psychological aid to be rendered in the reëducation of the soldier to make him equal to his task at the front again if possible. But any real psychological understanding and summarizing of the situation is obscured amid the discussion of symptoms, in which the emphasis is laid upon the variety of phenomena produced and the superficial means of combatting each symptom in turn. Reliance upon the already well worn concepts of pithiatism, and other such superficial terms, strengthens the great fault of shutting the eyes to a dynamic reality that works far more potently in the causation of these disturbances and more effectively when it enters into the therapy.

This book, like many others, leaves much to be said about the underlying factors at work in producing these psychoneurotic reactions to the conditions of war. It is to be hoped that the psychiatrists of our American units will awaken to the opportunity to apply the energic psychology to the varied psychopathological material which this war presents. Jelliffe.

The Tomb of Senebtisi at Lisht. By Arthur C. Mace and Herbert E. Winlock. The Metropolitan Museum of Art Egyptian Expedition, New York. 1916.

This recent publication inspires a gratifying feeling compounded of pride and sheer delight. Pride rejoices that this beautiful and unique volume should be the work of our own Metropolitan Museum of Art, the sense of delight is the reward of any student within whose hands the monograph may fall.

It is the first attempt to give a complete and unified description of any one tomb and this purpose the authors have most admirably carried out. They have manifested a genius for preserving details, which they explain are all too frequently discounted at the time of discovery and lost from usefulness in later reports and discussions. Evidently the sense of value with the authors and their fellow laborers, in the excavation of which this is the report and the literary product, led to a true evaluation of such details.

The carefully arranged descriptions of the excavation, the method of work, condition in which the tomb and its contents were found, the preservation and restoration of the material, form valuable data for general archeological knowledge, into which any student might wish to enter. They are designed even more to grant assistance and guidance to other explorers and particularly to form a background for comparative study of this tomb with other excavations.

Yet throughout the study the intensely human interest of the material unearthed seems to be uppermost in the authors' plan and in their appreciation. This it is that gives the work far more than a mere technical interest. The Notes on the Mummy appended by G. Elliot Smith add to this feeling of coming close to one more brief chapter of human history. Life manifests itself in its strivings, in the external, material supports and aids it gathers about itself in face of the great mystery and the symbols with which it sought to attain that immortality which in one form or another is the goal of impulse and aspiration. All these this simple yet interpretative description makes to live again and the reader enters into the life that was lived and the hope that was symbolically expressed and then buried deep beneath the sands to be read once more by sympathetic interpreters living the same life centuries hence.

The wealth of illustration is equally true to the double spirit of the book. There is the accuracy of photograph—the taking of these is an interesting bit of detail of excavation work—the carefulness of detailed drawings, which serve to bring the reader into close contact with the method and results of the work. On the other hand the free use of plates colored and otherwise represents the material just as it was found with all that its decay and confusion signify and the restorations in that spirit of sympathy which has given such vital meaning to the book.

The work is of definite value as the first of its series in such detailed report of this work of the museum. It is of even greater moment in its revelation of this buried reminder of human life.

L. Brink.

The Mythology of All Races. In Thirteen Volumes. Louis Herbert Gray, A.M., Ph.D., Editor; George Foot Moore, A.M., D.D., LL.D., Consulting Editor. Volume VI, Indian, By A. Berriedale Keith, D.C.L., D.Litt.; Iranian, By Albert J. Carnoy, Ph.D., Litt.D. Marshall Jones Company, Boston. 1917.

The author of the first part of this volume introduces his readers to a rich mythological literature which has neither beginning nor end. For this reason he has necessarily followed a restricted scheme of presentation which should grant some unified conception of the extent of the mythology and which yet intentionally or unintentionally opens up the stores of material which are the psychological expression of the folk mind, whether of the popular and unlettered or of the priestly and more cultured classes. The discussion confines itself therefore in the main to the mythology already crystallized around the accepted deities of India but presenting this as it is developed and recorded and gradually altered through the changing thought and form of religious life through the passing centuries of Indian history.

The author discusses thus successively the periods of the Ṛgveda, the books of hymns celebrating the chief Vedic gods, of the Brāhmaṇas, which as explanatory prose texts stand close to the Vedas which follow the earlier collection, and of the two great epics which succeed these. These in turn are followed by the Purāṇas, the composition of which continues even down to the present time and which constitute the Hindu authoritative sacred texts. Three chapters are besides devoted to the mythology of Buddhism, Jainism and Modern India.

As the author has noted, the earliest date of the Ṛgveda is but that of its possible composition, which already probably denotes an unwritten mythological literature reaching back into the remote past, while the fact that this same mythology is still in the making and still a living force in the lives and worship of a vast nation makes it necessary that the author should confine himself to one limited scheme of presentation. In the case of the Iranian mythology the field is much simpler and clearer and we therefore get a picture from the author of this second part of the volume of a mythology much nearer the common life of the folk themselves.

Neither the crowding out in the first instance of much of the fulness of myth, which lies nearer to the folklore itself, nor the attitude of nature interpretation toward which the author of Iranian mythology leans, prevent the revealing of many elements in this rich lore which denote the working of the minds of these peoples as they contribute to racial expression. Thus there is light here to further the knowledge of the hidden operations of the human mind, which express themselves in like symbolism in dreams, tendencies and largely in the still freer archaic expression of pathological symptoms.

It is this in which the chief value of these collections of ancient myths lies. Authoritative research presents and arranges the facts and there is just enough of the authors' own interpretation to form a unified and consistent presentation. Apart from this, however, are the indisputable facts which must grant further interpretation to any study of the human mind. A most prominent feature of the mythology, particularly as formulated in the Indian books, is the emphasis laid upon numbers, which appear to have a very special significance in the concepts which have formed the theistic lore. The distinguishing characteristic within this use of numbers, furthermore, is a species of megalomania, common enough to the child mind and familiar as a stage to which return is made in certain psychoses. These people, too, incline to multiply offspring, length of life, continuance of power, together with the possession of horses, chariot wheels, far-seeing eyes, to the number of hundreds and thousands and even millions. These are all projected upon the lives of the gods and even the number of Buddhas becomes multiplied from six to a final three hundred million, and the umbrella-shaped place of perfected souls has a length and breadth of four million five hundred thousand *yojanas* and a correspondingly greater circumference. One cannot but see in this the limitless magnification in which the autoerotic egoist is finally swept away in his phantasy world. He has sanctioned it here through his religious formulas of belief and worship which produce Brāhma from the lotus flower which springs from the navel of his father Viṣṇu as he lies musing, a missionary of Buddhism from the lotus without either father or mother, and which at best makes the Buddha self-procreated in the womb of his mother.

This latter infantile phantasy meets the reader frequently in which the wish fulfilment in the Œdipus complex thus boldly asserts itself. There are further manifestations of infantile birth phantasies, such as the swallowing of the Ganges by one Jahnu and its issuance again through his ears as his daughter, pregnancy produced by the cry of an ox-fish, also primitive identification of feces and gold, beside the more adult symbolisms of reproduction and birth which abound. There are also evidences of the closer

identification of the primitive mind to animal forms in the metamorphoses which meet us here as in the Greek and Roman literature. Much space is given by the author to the countless myths of the obtaining and guarding of the soma as of its value and power. Although no suggestion of its vital meaning and preciousness is here given, the striking facts revealed in the emphasis laid upon its value and its manner of appearance in the myths confirm its interpretation as the seminal fluid or life force, which studies of all ancient peoples as well as of individual dreams devolve upon the psychologist.

Such are but a few of the revelations of the universal human mind, its phantasy formations in its effort at expression which meet us upon these pages. They appear often with startling directness compelling to some fundamental interpretation apart from a mere explanation of objective external factors.

JELLIFFE.

MENTAL CONFLICTS AND MISCONDUCT. By William Healy, Director Psychopathic Institute, Juvenile Court, Chicago. Little, Brown and Company, Boston. 1917.

This most interesting and valuable book is the result of fifteen years of experience among juvenile delinquents in Chicago. In two thousand cases 7 per cent. were found to have been impelled to antisocial conduct by mental conflicts; moreover, the author believes many other cases might have had the same cause, though he was unable to uncover it. The children's misconduct consisted chiefly in running away and stealing, but there were cases of malicious mischief, violence, cruelty, self-injury, sexual offences, poisoning, and suicide.

It is clearly shown that the offenders usually do not know the cause of their actions. "I don't know what makes me do it. I don't want to do it, and I feel sorry afterwards" is a frequent lament. It is usually not difficult to probe into the memory of the child and discover relations between the compulsion to misconduct and some emotional experience, the recollection of which it tries to repress. This process of discovery the author calls "mental analysis" to distinguish it from the Freudian psychoanalysis of neuroses, which does not rely only on conscious memory but searches the unconscious mind through the medium of dreams.

He explains in detail the manner in which the suppression of ideas, tinged with emotion, develops into complexes, which are veritable dynamos of energy, impelling the victim often to commit acts which can bring him no pleasure and much sorrow and suffering. The initial cause is some emotional shock, such as the sudden discovery of sex matters, or of the fact that one is a foster or stepchild.

The author advises most strongly that parents cultivate confidential relations with their children, for the only common condition among his many cases was that the child had no sympathetic elder in whom to confide his troubles and hence repressed them. He also thinks that the child should early be given some biological knowledge so that personal sex knowledge will not come as such a shock.

The methods of mental analysis are fully explained, and it is shown how the impulse to wrong-doing often disappears after it has been traced back and its relation revealed to some early emotional experience. It is most useful to create confidences with some understanding older person, and to supply new interests. Sometimes a new environment must be sought to escape constant reminders of the original trouble.

Over two hundred pages are devoted to the detailed description of forty cases of boys and girls, most of whom were cured by intelligent treatment.

One can readily see how useless and superficial are punishments and exhortations to be good when the offenders themselves do not understand why they commit the acts.

This book should be read by all who have anything to do with delinquents, such as parents, teachers, judges, probation officers, institutional people, and pastors, and could very well be recommended to that conservative portion of the public which opposes prison reform by declaring that criminals are innately bad and deserve all the punishment they get.

DUDLEY W. FAY.

THE RELIEF OF PAIN BY MENTAL SUGGESTION. A STUDY OF THE MORAL AND RELIGIOUS FORCES IN HEALING. By Loring W. Batten, A.B., Ph.D., S.T.D. Moffat, Yard and Company, New York.

Happy in its mission is any book which will present to present day thought a fuller conception of the reality of a psychical life. For in extent and influence it does reach far beyond the limited factors to which man attributes his ills or his well-being and successes. A sincere effort to aid men and women to understand and control this greater life is surely commendable.

Such an effort requires, however, an equipment in knowledge of human nature, evolutionary, historical and individual, and an appreciation of a vital force at work in the race and the individual, the adjustment and adaptive exercise of which or maladjustment of which constitute the whole of success or failure, health or disease. In this moreover mind and body cannot be sharply separated nor their mutual working toward the same end be minimized, or distorted as a fact.

In all of this the book under consideration fails. It reaches partially into these things but then shows itself so obscured by the author's preconceived or traditional point of view that the result is no more than an attempt to exalt certain partial truths which suit his accepted formulas and grant a limited understanding of the human problems he claims to solve and the therapeutic aid he seeks to give. Indeed such partial truth and partial therapy may have its disastrous effect, at least in hindering the clearer understanding which brings health and efficiency.

His own words condemn him and create distrust of his methods. There is no suggestion of the dynamic power which is the force making for the life which is health as he talks of the casting out of the devil, even if in modern terms. The fact of a redirection rather than a casting out seems foreign to him. His narrow viewpoint reveals itself in the search for one "subconscious" idea as the source of suffering and the substitution of that by another. A verbose discussion of faith does not yet reveal what it is, nor its appropriation by the unconscious impulse of dependence to result in the actual reëstablishment of freedom for the vital force. When he asserts that a broad gulf exists between the insanities and the psychopathic diseases and rules out from his severe cases "the slightest taint of insanity," one understands how little he enters into such a psychology as that of Freud who, he thinks, has "solved the dream problem too easily." His insistence in the attempt to discuss psychoanalytic therapy, that is, his use of it, upon the trauma and its paramount importance reveals his imperfect acquaintance with psychoanalysis. Sincere Freudians have never found their master "too easy," nor have they felt that it is Freud who "broadens the sexual field to cover almost the whole of life." They seem to have found that nature put it there before others came to interpret it. It certainly would be "false knowledge" to attribute mental suffering to the "necessarily paying the penalty of sexual mistakes or vices." This statement is as surprising to the real students of

psychoanalysis as the misinformation that they "practice the sex cult," whatever that may mean.

JELLIFFE.

THE MIGRATIONS OF EARLY CULTURE. A STUDY OF THE SIGNIFICANCE OF THE GEOGRAPHICAL DISTRIBUTION OF THE PRACTICE OF MUMMIFICATION AS EVIDENCE OF THE MIGRATIONS OF PEOPLES AND THE SPREAD OF CERTAIN CUSTOMS AND BELIEFS. By Grafton Elliot Smith, M.A., M.D., F.R.S. The University Press, Manchester; Longmans, Green and Company, London, New York, Bombay, etc.

The descriptive title of this little volume contains a statement of its object. Yet it cannot convey that essence of spirited writing with which this gifted investigator and author flings out his facts with a telling directness and rapidity. His storehouse is so well filled anatomically, archeologically, anthropologically—might we say migratorially?—that one is convinced that he knows whereof he speaks with the familiarity of a writer at home amid well tested facts, and that he has presented in this brief form a contribution of definite advance in the knowledge and understanding of the influence of that nation which led the ancient world in point of civilization throughout a vast territory.

The practice of mummification is taken as the main feature indicative of this spread of influence from an original center. This is considered as a distinctive practice of the "heliolithic" culture, which built its stone monuments and worshiped the sun, associating with this also serpent worship. These are all indeed facts, which are here briefly yet convincingly traced in their relation to such a probable advance and spread of this culture from one locality to another on continent and island and continent again.

Nevertheless the evidence, flung as it is from the mass of attested facts, is hurled with such vehemence against those who oppose this view of migrations, anathematized as "psychologists" resting upon a purely independent evolution, that the author becomes rather lost in his own interpretative point of view. His statements, necessarily brief and forceful, fail yet to take sufficient account of certain other facts which psychology does force upon anthropologists. For those who are seeking to understand and disentangle the perplexities of individual psychology in the light of phylogenetic psychology, associations of chin pricking, circumcision, tradition of the deluge, and likewise sun worship, serpent worship, to say nothing of beliefs and customs concerning the dead, cannot be "clearly fortuitous associations of customs and beliefs, which have no inherent relationship one to the other." The "peculiar combination of freakish practices" which are discovered in individual obsessions or phobias or compulsions arising out of some dark phylogenetic background attest that some "theory of evolution" does "help in explaining these associations."

The material presented in the somewhat hurried form of this book is the forerunner of a fuller presentation to follow. All that substantiates the history which lies so remotely in the past aids in the understanding of the world's advance, therefore of all human problems. Fuller knowledge of the spread and adoption of cultural elements does not militate, however, against a universal psychical value in the elements which come to light. It clears our understanding of them while yet finding the same instinctive value and striving underneath it all, a common value and striving which belong not to a "highly specialized instinct" which we agree the true psychologist must deny, but to the fundamental instinct which urges man everywhere the same.

JELLIFFE.

THE DEVELOPMENT OF INTELLIGENCE IN CHILDREN (THE BINET-SIMON SCALE). By Alfred Binet, Sc.D., and Th. Simon, M.D. Translated by Elizabeth S. Kite. Publications of the Training School at Vineland, New Jersey, Department of Research.

The demand for the brief summaries of Binet-Simon's work which Dr. Goddard had made, evidenced by their extensive circulation, speaks for the value of this translation of the authors' own account of their work. It was, however, first of all to disarm the flood of criticism which was directed against partial knowledge of their work and the newness of it, which led Dr. Goddard to the publication of this translation, for which his assistant, Miss Kite, was particularly fitted.

The book consists of several publications describing the manner in which the need for such a scale became forced upon the authors' attention by the necessity for a more precise and adequate gradation of the intelligence of deficient children. Various writers had attempted to define the grades of mental defect and had contributed toward a classification which, however, lacked the definiteness of exact measurement and accurate statement.

There are three methods available for diagnosis and classification of these children. One is the medical, which takes account of physical signs but which is limited in its application and confined usually to those showing already marked signs of defect. Its field of application is given ample discussion but it is shown to reveal on the whole only *possible* signs of defect. The pedagogical method "which aims to judge of the intelligence according to the sum of acquired knowledge" reveals *probable* signs of defect. The psychological method of testing based upon direct observations has greater *certainty* of result.

It is this which the authors have worked out into a system of careful measurements as exact as comparative work upon normal and defective children can make it in the sphere of intelligence tests. The authors realized the variable material which this sphere implies for the work, but by their detailed discussion have made plain that their patience, their direct observation, sympathetic and appreciative of each child's attitude and all conditioning factors but quite free from suggestion, have produced a carefully wrought system of tests based upon actual experience and surprisingly simple and reliable. It is this simplicity which gives them their standard value and reduces them to this accuracy as a practical means of determining the child's proper status and possibility for education and training.

Incidentally the authors present some valuable criticisms and suggestions in regard to a more rational adaptation of education to actual needs and capacity, the need for which this system has detected. The painstaking quality of these men and their high valuation of the simple and direct are but the marks of their greatness of comprehension and have determined the amount of interest, thought and careful experimentation on which alone their final results are based. Such a system as theirs is a necessary basis for practical work, yet one can but look forward to the entrance into their more exact and static form of test of the dynamic conception of the deeper psychical factors which underlie both the measurable results of their tests and the individual mode of response to them.

JELLIFFE.

MAN'S UNCONSCIOUS CONFLICT. A POPULAR EXPOSITION OF PSYCHOANALYSIS. By Wilfrid Lay, Ph.D. Dodd, Mead and Company, New York. 1917.

The appearance of this book should bring to the author a doubly deserved recognition. He has for the first time presented in truly popular form an exposition of psychoanalysis, while remaining faithful to the principles of

the new science as it is utilized by the trained psychoanalyst in his researches into human nature and its problems of mental sickness and cure. The author's very readable and stimulating discussion arises from a thorough understanding of these principles and their practical application.

He has passed in condensed but comprehensive review over those factors which psychoanalysis has discovered of essential importance to the understanding of human problems. Their place in the history of man's evolution is emphasized and their vital persistence in the human psyche showing what dynamic power they continue to exercise. This factor of their preservation and emotional activity, comprised in the theory of the unconscious, is constantly held before the reader as most necessary to explain the countless phenomena of human activity and failure in activity, want of success in all degrees and forms, mental disturbances of all range. These are the things that hitherto had been falsely explained or too often left unexplained and simply accepted and allowed their undirected influence toward the loss and the hurt of both individual and society. This is all put into such telling popular terms with such a varied and happy choice of simile that the profound facts met with in psychoanalysis can be understood by all readers, and the intricacies and complexities of the energies of human life must receive a new value to the general public.

At the same time there is no minimizing of the difficulty of the task of arriving at an understanding of this double mental life, which manifests itself thus in two modes of functioning in separate spheres of the psyche. Therefore the author insists upon the necessity of the aid of the trained psychoanalyst for satisfactorily understanding and learning to control the unconscious realm. This applies particularly to the understanding and readjustment necessary in mental ailments, where the disharmony has become an actually painful and detrimental disturbance, and also in the field of pedagogics, in which the usefulness of a psychoanalytic knowledge is discussed at some length.

The general reader may feel that the picture is rather a discouraging one as he gains this knowledge of the immeasurable mass of social impulses which are revealed at work beneath the surface of the commonly accepted mental life. Perhaps the author has, in the interests of making clear the great unconscious inheritance and its constituent elements, laid the emphasis upon the negative side of these, somewhat to the neglect of the positive contribution from this vaster part of mental life. He by no means neglects to call attention to the latter, but to the reader unacquainted with the complete work of psychoanalysis there may arise a sense of an overwhelming vastness of that against which we contend and the multiplicity and darkness of its details. It is necessary that man should thus come to know what it is that exerts such influence beyond his conscious sight, but he needs also a clear recognition of the value of the preservation and activity of that great accumulation. Lay has indeed made this the solution and outcome of all this exposition but he might have made it fuller to the thought of his reader.

L. Brink.

The Mythology of All Races. In Thirteen Volumes. Louis Herbert Gray, A.M., Ph.D., Editor; George Foot Moore, A.M., D.D., LL.D., Consulting Editor. Volume IX, Oceanic. By Roland B. Dixon, Ph.D. Marshall Jones Company, Boston.

The study of mankind is man. This old but too often forgotten truth is brought home forcibly by the invaluable material gathered into this book. The author himself seems not to give that truth its full value as the guiding motive of such a collection of material. His concern seems to lie rather with the distribution and character of the myths as related to the possible

and probable migrations of the oceanic peoples and the consequent migratory diffusion of the tales. He suggests, of course, amalgamation with more native elements and existence of aboriginal types, but in his summaries seems to forget that he is writing mythology, the primary interest of which is intrinsic in the myths as human expression and not the particular geographical location in which they lie at any particular time.

Myths are an unquestionably indispensable aid to studies in migration and amalgamation of races and peoples, but at least for our interest the myths themselves, just where they appear, whether indigenous or adopted, represent existing human thought and values. Fortunately the author presents his own hypotheses only in the brief summaries and as purely tentative and subject to further research, and at the same time as merely a guiding motive to give unity to his work.

They therefore in no way detract from material, rich and extensive in spite of the difficulties in the way of obtaining it, which these pages afford. The volume represents wide research, scholarly appreciation and a unified clearness of arrangement of matter from so wide and yet undeveloped an area, combined with that rare absence of the author's own interpretation, which leaves the material fresh and unspoiled for students of its varied phases.

The student, therefore, who recognizes in the disturbances of the mental life a return to older methods of thought, even to the content of such thought, and counts the development from such form and content part of the development of each individual, reads with a profound interest these myths and legends. They are not ludicrous or trivial nor even naïve only in so far as they express the racial child mind much nearer the beginnings of human thought than many mythologies of other lands. For the latter have been brought so much farther into cultural elaboration that they have lost much of the directness, freshness and simplicity, these elements which appear here and again in the psychology of each individual twentieth century child.

There is the same disregard of ultimate origins, satisfaction with partial explanations which leave much simply accepted, with which the child at first pins faith on the ultimate final authority of the parent. Explanations of events and of emotional, or better expressed, of wish situations, are expressed with simple directness. There is, moreover, a deeper sinking of the shaft of interest into the solution of conflicts which arise out of these wishes and the universal resort to symbolism.

Out of this uniformity of unconscious aim which makes itself apparent to the thoughtful reader, if he has grown at all familiar with this strange unconscious world, certain elements stand forth with striking appeal, and reveal the common human effort at self-expression and the great conflict which underlies all humanity. Thus there return infantile creation and birth theories which in their unelaborated form lie close to those which still arise in infancy and have strange power to disturb the adult attitude toward life.

Creative power goes forth through the eye or the word of the mouth; men arise from worms which are created first; or they are formed from excrement which is tickled into life. The serpent also plays a large and significant part in creation myths or in miscellaneous tales.

More significant still are other myths in which certain tendencies of the unconscious find a wider scope of action expressed in a more or less elaborated form. Among these are tales of peeping upon beautiful maidens who bathe and the winning of one of them for wife, such as have been preserved in some of the rare literature of cultured lands; the swan maiden motive, likewise well-known. There are those also that come closer to the fundamental individual struggle known as the Œdipus complex. A typical tale of the struggle of father and son is that of the killing of the giant by Bada-

gangisa, whom the giant called his son because he was born from one of his mangoes, which the mother had eaten; while the cycle of tales of the hero Maui, the clever youngest brother who always outwits the older ones, represents also a widespread form of the individual power struggle.

Beneath whatever elaboration these myths have received, behind the incompleteness of their form and of available information concerning them, lies the universality of motive and impulse. They represent an attempt at self-expression common to the human race. In the material which is here presented it matters but little whether it arose straight from the soil where it has been found, whether it has drifted there, or whether it is a product from more than one area. It opens but another fruitful page of the language which all races can read and understand for it arises ultimately out of the impulse which feeds, through an immeasurable past, the psychical life of us all.

L. Brink.

Rest Days. A Study in Early Laws and Morality. By Hutton Webster, Ph.D. The Macmillan Company, New York.

This is one of those books which present a field of boundless opportunities. In this the author manifests the true investigator's spirit of open-mindedness, of patient comparative research, of tentative hypothesis and willingness to expand or adopt whatever theory will best embrace the limitless variety of facts which make up the history of mankind and which are only slowly and incompletely discoverable.

His theme is the development of man's sabbath days from their beginning in the taboos which hedged early primitive man, and which yet had their beneficent influence in restraint and rest and cultural development, to the holiday sabbath of the present day. These taboo days are established at critical epochs and on particular occasions especially after a death. The holy days reveal a close connection with these tabooed periods, probably indeed arise out of them, which is quite in accord with the earlier mergence of the idea of sacredness with that of superstitious awe and dread, to which Webster calls attention.

An interesting chapter discusses the market days found as an important institution in widely separated parts of the primitive world which mark a rest day from agricultural labors as well as an opportunity of exchanging the products of labor. The market day also develops into the market week and this period ends often in a holiday while certain of these days in various regions likewise become sacred to certain deities.

The periods of time which these weeks constitute are of varying lengths but in the main such division of time is dependent on observation of the moon's phases and the wonder and fear and belief in magic influence which this inspired. The discussion of these introduces much valuable material in the study of man's psychical development and the establishment of scientific knowledge and of useful institutions out of these beginnings.

Particular attention is given to the so-called evil days in Babylon, their relation to the phases of the moon and particularly of their *shabattum*, which seems to have occurred at the fifteenth and probably then also on other days which marked the moon's changes, all "evil days" on which gods must be propitiated and conciliated.

A similar discussion seeks to trace the growth of the Hebrew sabbath, with a consideration of the various theories which have been advanced in regard to its origin, which have often failed to take into account its lunar origin in the early experience of the Hebrews themselves. The frequent association in the Scriptures of the moon periods and the sabbath points to such a gradual development of the scriptural Sabbath. It had become ration-

alized by religious interpretation and prescription and later was shifted into the Lord's Day, not unassociated even in the Christian era with the sun god, to whom in the planetary arrangement and naming of the weekdays one day had been attributed.

Nor has Christendom yet shaken off the influence of unlucky days which played so great a rôle in primitive thought and through all the history of man. These mark the survival still of the original taboo idea, their close association with holy days to which they gave rise, while with man's tendency to convert "his fast days into feast days" they gradually acquire the character of festivity with which they are more and more exclusively associated.

Thus is the history of the institution of the week of seven days traced throughout the world. Other periods of time precede it, accompany it or persist instead of it, most of them explicable by reference to the moon's phases. The question of numbers in the divisions made all over the primitive and ancient world contains much to stimulate interest in further research. The author not only brings together a wide collection of obvious interpretative facts, but he lays his finger suggestively upon a deeper significance which numbers, particularly the number seven, may have had to the primitive mind. He has passed by profound psychical sources as explanatory, not, however, one feels, in neglect of these but with an appreciative realization that there may be unexplored depths, such as those to which psychoanalysis seems to hold the key, a key which he has evidently not yet used.

He has, nevertheless, presented such rich material that he has extended the fertile field before psychoanalysis. His footnotes and the bibliographies are of very practical value also in the pursuance of this field, particularly in the number study. Moreover, his attitude, the reader feels, is in complete accord with a profounder interpretative study toward which his book leads and which seeks, as he constantly suggests, the impelling causes of man's manner of development and the institutions he creates in his inherent psychical life.

JELLIFFE.

PHYSIOLOGICAL CHEMISTRY. A TEXT BOOK AND MANUAL FOR STUDENTS. By Albert P. Mathews, Ph.D., Professor of Physiological Chemistry, The University of Chicago. Illustrated. William Wood and Company, New York. Price $4.25.

It is highly gratifying to see such an excellent work appear from one of our American universities—a work not only broad in its scheme but thorough, painstaking in its accuracy and reaching out to the full in its supply of chemical information. Furthermore, it is not alone chemistry, it is also good physiology, sound biology, and, above all, in spite of its formidable size and encyclopedic character, truly utilizable in the daily problems of the practice of medicine. The chapters on the cryptorhetic tissues are especially valuable. However, we should like to see Dr. Matthews apply his knowledge of electrical phenomena in the nervous discharge to the physiology of these hormones in their action on the vegetative nervous structures. He does not take us beyond the descriptive phase in his interpretation of the phenomena.

We venture to say this is the most complete and most valuable work on physiological chemistry which has appeared in the last ten years.

JELLIFFE.

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Original Articles

A REPORT OF THREE CASES OF CHRONIC PROGRESSIVE LENTICULAR DEGENERATION, WITH MENTAL DETERIORATION*

JOHN JENKS THOMAS, A.M., M.D.

Since the report of six cases of progressive degeneration of the lenticular nucleus by Wilson in 1912, the literature relating to this condition has increased rapidly. We have to thank Wilson for a very clear outline of a definite group of cases, derived not only from the study of his own six cases, but of six others from the literature, with ten autopsies in the twelve cases. So carefully and painstakingly was this work done that writers, since then, have been able to add practically nothing to his work.

Let me give briefly from Wilson's article his description of the clinical features of this condition. He describes it as occurring as a familial, but not a hereditary disease, in young people, and running at times an acute, and at others a chronic course, the duration varying from six months to four or five years. The symptoms are involuntary movements, which he describes as a tremor, nearly always bilateral, and affecting both upper and lower extemities, usually rhythmical, occasionally irregular, increasing with volitional movements of the limbs. There is pronounced spasticity of the limbs and of the face which is usually set in a spastic smile, and in the later stages contractures develop and there is dysphagia, dysarthria, and eventually anarthria; while sometimes spasmodic laughing and emotionalism is seen. With this spasticity and con-

* Read at the meeting of the American Neurological Association, May 21, 22 and 23, 1917.

tractures, there is no definite increase of the tendon reflexes, and there is a flexor toe reflex. Pathologically there is found a bilateral, symmetrical softening of the lenticular nucleus, mostly in the putamen, the globus pallidus being involved to a less extent. The external capsule may be partially included in the affected area, and the caudate nucleus may show slight degeneration, but the internal capsule escapes. There is also constantly a cirrhosis of the liver, which however, in the reported cases, has failed to produce symptoms during life. Though not included in the general description of the disease, Wilson also states that definite mental symptoms were present in eight of the twelve cases.

The three cases which I wish to report differ in several respects from the typical picture of Wilson's disease, and yet, in spite of this, I have not been able to find enough difference to warrant a separate classification of these cases, though this may be possible in the future, with the added information obtained from post mortem examination of such cases. The reasons for considering these cases as a form of chronic lenticular degeneration are chiefly that our knowledge of the clinical signs of disease of this portion of the central nervous system best explains the probable anatomical situation of the pathological processes, if we consider it possible for these to extend into the internal capsule, in certain cases, or with certain pathological processes.

These cases comprise three children in one family, similarly affected, thus showing the familial character of Wilson's disease, with no discoverable heredity, another point of resemblance.

Case 1. Salvatore C. Children's Hospital, Department for Nervous Diseases. No. 540. Seen first on Oct. 18, 1916. Born Sept. 8, 1900. Age 16 yrs. Born in Italy. Residence, Worcester, Mass. Family History: Father, 44 yrs., born in Italy, at Avolina, near Naples. Came to the U. S. 14 years ago. Occupation, laborer. Mother, Ursula, age 40 yrs. Born in Italy. The father has two brothers living and healthy. One brother died at 36 yrs., cause unknown, but had been healthy. Mother had two sisters and one brother, all healthy. Four others died from unknown causes. In neither family were any members known who were affected like the children. The parents are both healthy persons, sober and industrious, and ambitious for their children. There was no history of alcoholism. They have been married 18 years. The children are: (1) Salvatore, age 16 yrs., 1 mo., case 1; (2) Josephine, age 13 yrs., 9 mo., case 2; (3) Joseph, age 11 yrs.; (4) Christy, age 8 yrs., 6 mo., case 3; (5) Mary, age 7 yrs.; (6) Rose, age 5 yrs.; (7) Vincenzo, died, aged 19 days, after three convulsions cause unknown.

Physical examination of the parents showed normal gait and station. No tremor, ataxia, incoördination or weakness of the motor system. Pupils normal in reaction to light and distance, and regular. Movements of eyes normal, with no strabismus or

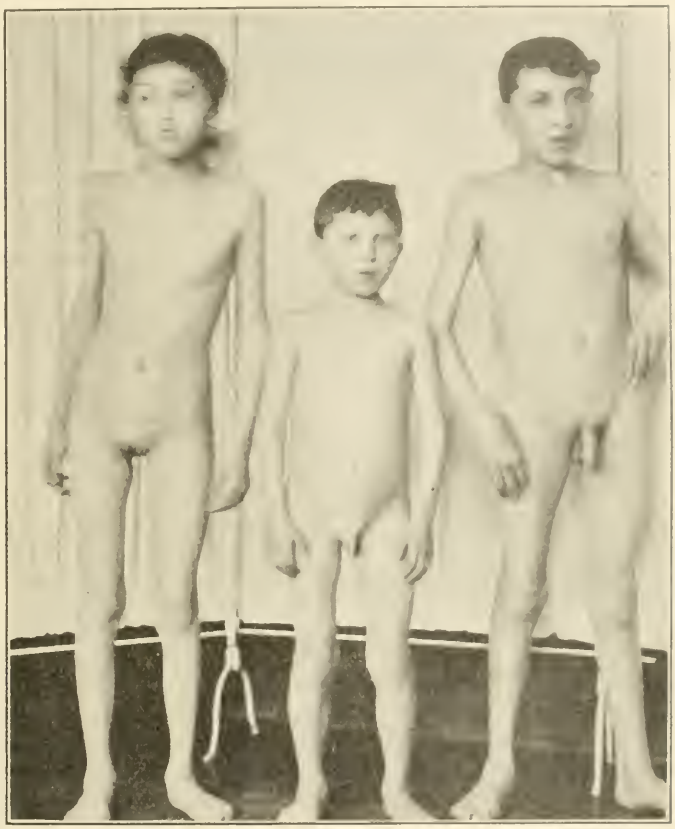

Fig. 1. Three cases of progressive lenticular degeneration.

nystagmus; and the knee jerks, ankle jerks, and plantar reflexes were all normal, the latter being of the flexor type. The Wassermann test of the blood was negative in both parents.

The previous history in the case of Salvatore was that the labor was not difficult, and the baby was not asphyxiated when born. He had had some digestive trouble at the age of 1½ years, and also measles, pneumonia and pertussis. Once, when an infant, fell down stairs, but no bruises appeared, though there was some swelling of the places where he was struck. He also had rather a bad fall about a year ago, with no definite injuries, but considerable shock (fright?).

School was attended by the boy, and he was promoted till he

was in the fourth grade, but since then his physical disabilities have prevented further school attendance. The present trouble began to show first in his gait, when his parents noticed, in his fourth year, that he was beginning to walk on the toes. Before this nothing peculiar had been noticed by them in any way, and he had not been backward in learning to walk, or in other things so far as they could judge. This difficulty continued, and at the age of six years they first noticed a tremor, which they described as being "all over." About a year later, when seven years of age, he began to drag the feet in walking, probably the first evidence of rigidity of the muscles of the lower extremities. He also fell very often, as a consequence of this difficulty in walking. His condition gradually grew worse, and still continues to do so. About April, 1916, he was compelled to begin to use crutches in order to get about, as he had much more difficulty in walking. He has noticed no disturbance of sensation, aside from the fact that he complains of occasional pain, apparently slight, in the upper part of the legs.

Physical Examination.—The boy is somewhat small for his age, being about as tall as the average child of eleven or twelve years, but both parents are of the short, stocky, southern Italian type. The head is somewhat short, but not remarkable in shape. Aspect not especially dull. Responds promptly and coöperates in the examination. There was no set smile.

Gait.—Walks with spastic gait, the knees being held slightly flexed and adducted, there being a distinct tendency to keep the knees together. The feet are dragged and are held in a position of valgus. While walking, there is a marked, coarse, somewhat irregular tremor of the whole body. There is moderate rigidity of the lower extremities on passive motion, and possibly very slight spasticity in the arms. There is a distinct tremor of the arms, very slight, and at times practically ceasing during relaxation, and definitely of the intention type, gradually increasing with volitional movements, and continuing to do so throughout the action, so that at the end of a purposeful action, it becomes ataxic in character. In attempting to drink from a glass half full of water, most of the contents of the glass is spilled before it can be brought to the lips.

Reflexes.—The knee jerks are increased and equal, with patellar twitch, but no patellar clonus. There is slight double ankle clonus. Plantar reflex is of the typical extensor type, in both feet, but Oppenheim's reflex is absent. The triceps, biceps and radial reflexes are increased and equal in the fore arms. The abdominal and epigastric reflexes are present and equal. The cremasteric reflex is absent. There are no contractures of the tendo Achilles or elsewhere in the body.

The pupils are equal, regular, and react promptly and normally, to light, and on accommodation. The ocular movements are perfectly normal, with no suspicion of nystagmus, and no strabismus. The vision for distant and near is normal, and the fundi show no atrophy or pallor of the discs and no changes in the retina or vessels.

The tongue is central, protruded easily and without tremor. The hearing is equal and normal.

Sensation for touch, pain, temperature, vibration, and joint sensation is normal everywhere.

The speech is a little slow and hesitating, but not slurring or scanning in type.

For mental tests I am indebted to the kindness of Dr. Walter E. Fernald, superintendent of the Massachusetts School for Feeble Minded, as tests of all these children were made at the Out-Patient Clinic of this school, the results of which he very kindly sent to me.

In regard to Salvatore the report is: Reads well in fifth reader. Spells fairly well; writing legible, but poor because of tremor. Arithmetic very poor. Mental age, as graded by Binet–Simon tests, modified by Goddard, ten years. Does little involving comprehension. It is further noted in regard to the patient that when he left school, he had been placed in an ungraded class where he had been doing fourth grade work.

Case 2. Josephine, age 13 yrs. 9 mos. Children's Hosp. Nerve Records No. 541. Seen first Oct. 17, 1916. Born Jan. 8, 1903, in Worcester, Mass.

Previous History.—Birth was normal, and child was not asphyxiated. The mother had an abscess of the breast, so was unable to nurse the child. She cut her first tooth at 12 months and talked at 13 months, and walked at one year.

At one time a "lump" appeared on one side of the neck, rather low down, which was operated upon by incision.

Present Trouble.—When 8 years of age the first symptoms were noticed by the parents as she began to tremble slightly and to drag the feet in walking. She complains that at times in cold weather the feet pain. The condition has grown worse gradually, as did her brother's. Now she can use the hands very little. Since the disease began to develop she has stopped in mental growth. She was formerly in the second grade at school, but has had to be put into an ungraded class, which she was still attending when first seen. She herself says she can add and subtract today as well as she could five years ago.

Physical Examination.—Girl rather small for her age, but not markedly so. Head not remarkable in shape or size. Aspect slightly dull. Responds and coöperates well. Walks unsteadily, with knees slightly bent, and somewhat stiffly, and dragging the feet a little, but distinctly less spastic than the older brother. While walking there is some tremor of the body. Moderate spasticity in the legs on passive movements, but not in the arms. No contractures. No spastic smile. Knee jerks increased and equal. Slight ankle clonus. Babinski's sign in both feet, but no Oppenheim's sign. Triceps, biceps and radial reflexes increased and equal on the two sides as are all the reflexes. Abdominal and epigastric reflexes present and alike on the two sides. Pupils equal, regular and normal to light and distance. No strabismus or nystagmus. Vision and fundi normal. Tongue central. No tremor of tongue

or lips. Hearing normal. Sensation for touch, pain, temperature, vibration and motion is normal.

Speech a little hesitating and jerky.

Report on Mental Development.—Mental age, by Binet-Simon's test, 9 yrs. Does little involving comprehension. Reads well in third reader. Spells easy second and third grade work. Cannot write legibly because of tremor. Can do simple combinations in adding, subtracting and multiplying, but not dividing. Practical knowledge not at all good for her age. Plays but little. Is kind, affectionate and obedient. Beyond rather quick temper, no bad moral characteristics noted.

Case 3. Christopher C. Boy, age 8 yrs. 6 mos. Children's Hospital Nervous Records No. 452. Seen first Oct. 11, 1916. Born Feb. 12, 1908, at Shrewsbury, Mass.

Labor normal. No asphyxia at birth. Walked at one year. First teeth at one year. Talked at 2 years.

No unusual history. No severe illness. Once fell from a piazza from which he was hanging, but was not injured. He has had measles and chicken pox.

About six months ago the parents noticed that this boy also had developed a tremor all over the body, which has continued, and also that his voice began to quiver. Lately his gait has begun to be a little awkward and unsteady, and he cannot walk along a straight line. He can dress and feed himself, and in school is in the first grade. The parents have noticed no mental change.

Physical Examination.—Well marked tremor of body when walking. Gait slightly stiff with tendency to drag the feet. Child a little small for his age. Head not remarkable. Not dull in aspect.

Distinct intention tremor in hands when performing volitional movements, but none seen when hands are at rest. Legs slightly spastic. Arms show no evidence of spasticity. Knee jerks increased but equal. Slight double ankle clonus. Babinski's sign present on both sides. No Oppenheim's sign. Triceps, biceps, and radial reflexes present and equal. Abdominal, epigastric and cremasteric reflexes normal.

No contractures. Speech not remarkable except it is a little slow. Pupils equal, and normal to light and accommodation. No nystagmus or strabismus. Vision and fundi normal. Tongue central with no tremor. Hearing normal. Sensation for touch, pain, temperature, vibration and movements normal.

Mental Examination.—Binet-Simon's test, age 5 years, reaction is very much delayed. Does not do well on Seguin board. Cannot read, spell or write. Does combinations to 6. Practical knowledge very poor, even for a child of his age.

Social Reactions.—Plays with children of the neighborhood. Not very affectionate. Somewhat destructive. Likes animals. Moral reactions: Does not lie or steal. Knows difference between right and wrong.

Let us now give briefly the results of the examination of the other children of this family.

The third boy, Joseph, 11 years of age, was born at term, as were all of the children, and the birth was natural. He has had measles only. None of the children has ever had scarlatina or diphtheria. Joseph has attended school, but has been a year in almost each division of each grade. He walked and talked at 11 months. First tooth at one year.

On examination his gait is slightly stiff, but no contractures are present, and the feet can be brought to a right angle with the legs. There is no tremor of hands, tongue or body, nor any ataxia or incoördination. No spasticity. The knee jerks are lively and the ankle jerks also, with, at times, several movements in testing for an ankle clonus. The plantar reflex is of the flexor type. Neither Babinski's nor Oppenheim's sign is present. Sensation for touch, pain, motion and vibration is perfectly normal. Vision and fundi normal. Pupils and ocular muscles normal.

Mental Examination.—Binet-Simon's grade 9 years, but very irregular. Point scale. 8.7 years. Does Seguin performance board at rate of an 8-year old.

Social Reactions.—Plays with children of his own age and has no bad habits of behavior, or disobedience. History of school progress—has been a year in almost every division of each grade. Does fairly well in third grade reading. Other work good or fair. Moral reactions: Does not lie or steal, nor is he selfish. There is evidence that this child was probably brighter than now.

Mary C., the fifth child, age 7 yrs. 4 mos. Began to walk at one year and got first teeth and began to talk at the same time. Is clean, good natured, and no peculiarity noticed. School work: Has been attending school only since September, and examined Nov. 21, 1916. Reads several words. Language fair. Good in school. Social reaction: Plays with children of her own age. Is loving and obedient. Does not lie or steal and is not selfish. Binet-Simon's test gives mental age of 6 years. Performance test barely average for her age, and coördination poor. Shows marks of a degenerative process.

Rose C., the sixth child, age 4 yrs. 7 mos. Began to walk and talk at about the age of one year and got first teeth at the same time. Is clean in habits. Has never been to school. Plays with children of her own age. Is obedient and affectionate. Afraid of animals. Is as good as any child. Binet-Simon's test, age 5 yrs. Performance tests are poor, even for an ordinary four-year old, let alone one testing ahead.

Mary and Rose on examination show no evidence of any beginning affection of the nervous system, such as was found in the other children, there being no tremor or change in reflexes, or any other abnormality.

A letter dated March 8, 1917, from the school nurse, Miss Edith M. Dixon, to whom I am greatly indebted for help in getting the information in regard to this family, tells briefly of the present condition of the children. She writes, "I think the children are in rather worse shape than they were when you saw them last. Salva-

tore walks with the greatest difficulty, and Christy seems to me to show an increased tremor. Owing to the high cost of living the mother has had to go to work as well as the father, so Salvatore has turned general housekeeper and cook, while Josephine makes the beds. They rely upon Joseph to set the table and handle the dishes, for, as Salvatore rather pathetically remarked, 'he and Josephine don't dare to touch them for fear of breaking them.'"

It will be seen that these cases differ in several essential points from those reported by Wilson, first in the character of the tremor, the absence of fixed spastic smile, the dysphagia, and especially in the evidence of the affection of the pyramidal tracts. There was also no evidence of any affection of the liver so far as could be determined.

I saw all the children again on June 3, 1917, and examined them and found no definite change in the condition beyond a possible slight increase in the severity of the condition as compared to that when they were first seen. Josephine was at that time ill in bed with an acute feverish condition and some evidence of endocarditis, but the symptoms on the part of the nervous condition showed no change in so far as the examination possible showed.

In some respects these cases much more closely resemble multiple sclerosis, yet there are various and important reasons for rejecting this view. First, the distinctly familial character of these cases, with three children out of six in one family affected, and a fourth probably beginning to show the characteristic signs, which are so similar that even the parents now have grown to expect the appearance of the symptoms as the children approach the age of eight years. Then the absence of nystagmus and changes in the eye grounds, and the steady progressiveness of the disease, the absence of remissions in the symptoms, and most important of all, the mental deterioration must be considered. These differences are enough to justify one in considering that we have to do with a process distinct from that found in multiple sclerosis. Wilson himself, in speaking of the differentiation of his cases of lenticular disease from multiple sclerosis, speaks of there being no nystagmus, optic atrophy, amblyopia, paresthesia or objective changes in sensibility, as well as the absence of loss of the abdominal reflexes, extensor response and ankle clonus. He also states that the dysarthria is not identical and the rigidity more widespread, nor is there the variability of symptoms. He adds, however, that if there is intention tremor and slight dysarthria only, the case would be difficult to place.

Wilson, in describing the tremor (p. 439), speaks of it as a true tremor, that is, a regular, rhythmical, alternating contraction of a given muscular group and its antagonists. The rate is variable, but usually four to eight times a second. It is increased, as a rule, by excitement, or if attention is drawn to it, or by voluntary effort. Thus it is always brought out well in the finger to the nose test. At other times it appears to be, to a certain extent, under the control of the will, and could be inhibited partially. It was more marked in the fingers and hands, and peripherally, and affected these segments of the limb first. The bad handwriting was frequently remarked as one of the early signs of the disease. The range of the tremor is usually fine, while with volitional movements the excursion becomes wider, and as the disease progresses, the tremor becomes worse in every way. In some of the cases the movements were more of a choreiform character—"tonic or clonic spasms," and these again were always increased by attempts at volitional movements.

In speaking of the mental symptoms, Wilson says (p. 446) that these were seen in eight of his twelve cases, and there was a mental impairment which was variable in degree and kind. In two of Gowers' cases, the mental condition was not described, and in the others it was stated as listless, lethargic and emotional. Omerod describes his case as "silly," noisy, and apparently idiotic; "his mental condition seemed to get worse, and he lay howling all day long." Homén calls the mental state "dementia," and describes it as listlessness, mental slowness, failure of memory, emotionalism, etc. Wilson, in his cases, saw changes in disposition, and at first restlessness, laughing easily, manners childish, and mental powers to a certain extent diminished, but the memory was good for a long time at least, and little defect was observed on the receptive side. Another child became untidy in dress, received poorer marks in school, and later developed transient delusions, was emotional, and had to be cared for, "such was her childishness." His third case at first showed a toxic psychosis, with delusions and hallucinations of hearing, and excitement, but these symptoms passed and did not recur. Later the patient was emotional, and childish like the sister, though less so. His case 5 was also dull and stupid, though bright before; and was emotional and slow in understanding. His fourth case showed no mental change at the time when seen. He speaks of a narrowing of the mental horizon, docility, childishness and emotionalism, with spasmodic laughing in some of the cases, but never spasmodic crying. There was no agnosia, or apraxia,

and no disorientation for time or place. Some reported cases of Wilson's disease show normal mental faculties, but most of them greater or less deterioration.

These cases presented in this paper show, perhaps, the closest resemblance to those described under the title of pseudo-sclerosis. As given by Higier, the chief symptoms are tremor of the body and strongly oscillating tremor of the head, arms and legs, usually less or ceasing in rest. Muscular rigidity, slow and scanning speech, epileptiform and apoplectiform attacks, pigmentation of the skin, and at the periphery of the cornea, of a brownish-green color, diminution, or at times an enlargement of the liver, and palpable spleen, mental deterioration and progressive dementia, but with no loss of muscular power, disturbance of sensation, and absence of hypertonia and changes in the reflexes. Wilson regards his form of disease as closely related to pseudo-sclerosis, but states that this latter term is used vaguely and the cases showing this syndrome require closer study with more modern methods of investigation of the changes in the nervous structures. In some of these cases. changes in the reflexes indicative of affection of the pyramidal tracts were observed. Oppenheim mentions that ankle clonus was present in the cases of Fichler and Schülte, Oppenheim's sign in A. Westphal's case, and Babinski's sign in Hörslin's and Alzheimer's case.

Spiller quotes Bostroem's analysis of 25 reported cases of pseudo-sclerosis, of which 22 were with necropsy. Tremor was present in all the cases, twice resembling paralysis agitans, and once chorea. There was disturbance of speech in all the cases, usually stammering, and it was indistinct, and unlike that of multiple sclerosis. Changes in the pupils and eye grounds and nystagmus were not observed. The muscles were often rigid, the gait generally tremulous, and spastic in four cases. There was mental impairment in fifteen of the cases. The age of onset varied between the tenth and twentieth year, the latest being the twenty-fifth year. The duration was from one to twelve years. Bostroem found marked lesions in the lenticular nuclei, dentate nuclei, and cortex of the cerebrum and cerebellum, the changes consisting chiefly of disappearance of the nerve cells and proliferation of glia, together with alterations of the vessels. In most of the instances of pseudo-sclerosis the cases were isolated and not familial.

Our cases showed no pigmentation of the skin or cornea, no epileptiform attacks, no enlargement or diminution of size of the liver, and were distinctly familial in character.

The symptom complex of disease of the corpus striatum, as pic-

tured by Oppenheim and Vogt: that of bilateral athetosis, spasm without paresis or disturbance of sensation, is the result of defect of the caudate nucleus and putamen, the so-called status marmoratus. Spiller includes among the conditions due to disease of the lenticular nucleus, in addition to Wilson's progressive lenticular degeneration, the pseudo-sclerosis of Westphal and Strumpell, which we have just been considering, Huntington's chorea, Parkinson's disease, spastic pseudo-bulbar paralysis with contractures, and choreo-athetoid movements of Oppenheim and Vogt, Oppenheim's dystonia muscularum deformans, and progressive athetosis. He adds as probably due to disease of this region v. Bechterew's hemitonia apoplectica, and certain forms of carbon monoxide poisoning.

I feel that in the absence of any necropsy in any of these cases, I am not only unable to throw any light upon the different views in regard to the classification of these groups of affections in which the lenticular nucleus is affected, but I am not justified in absolutely identifying the remarkable group of cases shown in this family with any single one of them. The study of the reported cases of pseudo-sclerosis shows that under this title we undoubtedly have more than a single type of disease, and certainly we should reject the idea that such symptoms on the part of the nervous system can occur without definite pathological changes to produce them. The greater part of the cases reported as pseudo-sclerosis, if examined by modern methods, would probably show pathological changes, chiefly in the lenticular and striate nuclei, and possibly widespread changes in other parts of the brain, and the attempt must be made to differentiate these cases from those where the lesions are more sharply limited to the lenticular nucleus, or some definite part of this nucleus as the putamen or the globus pallidus.

It seems to me the cases reported in this paper, so far as one can draw conclusions from cases in which no anatomical examination has been made, resemble rather the cases described by Wilson than any others. This particularly because of the familial character, the progressive character, the age of onset, and the combination of tremor with hypertonia of the muscles. The points of difference are, on the other hand, the more chronic course, the difference in the character of the tremor, the absence of involvement of the face and muscles of deglutition and articulation, and chiefly the clinical evidence of involvement of the pyramidal tracts. These marked differences would, I think, justify us in considering these cases as probably due to a process more degenerative in character than destructive, and probably not as sharply limited to the lenticular nucleus

as the changes found in Wilson's disease, and very probably with no affection of the liver, such as is constantly found in Wilson's lenticular softening.

Certainly, as Spiller has shown in his article on the family form of pseudo-sclerosis, many other types of disease, with considerable variation in clinical manifestations, are probably due to affections of the lenticular nucleus, and I venture the prediction that cases showing the clinical syndrome found in this family will eventually be proved to belong in some such group of diseases.

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DISPENSARY WORK IN DISEASES OF THE NERVOUS SYSTEM, IV[1]

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This is the fourth annual report of the dispensary service of Professor Hammond and covers the clinical work of the dispensary for the year 1914. The first published report, that of 1911, appeared in the Post Graduate, June–July, 1912, and contained a brief historical summary of the work hitherto done at this dispensary. The second annual report for 1912 appeared in the Post Graduate for August, 1914, and that of the clinical work of the dispensary for 1913 in The Journal of Nervous and Mental Disease, January, 1916.

The personnel of the service during the year 1914 shows some slight changes and consisted of the following: Professor M. G. Hammond; Adjunct Professor S. E. Jelliffe; Chief of Clinic Dr. C. N. Haskell; Instructor Dr. F. H. Barnes.

There was also a considerable increase in the number of patients testifying to the increased facility for satisfactory treatment of the patients presenting themselves.

Lectures

During 1914 the regular course of clinical lectures was given by different members of the staff. These were illustrated by charts, gross anatomical specimens and photographic and microscopical projections. The list in part is as follows:

Prof. M. G. Hammond.

January 14, 1914. Tabes (results of treatment, 2 cases); Traumatic Neuritis (1 case); Bell's Palsy (1 case).

January 21, 1914. Neurasthenia (2 cases).

January 28, 1914. Bulbar Palsy, Encephalomyelitis, Syphilitic (1 case); Mental Defective (1 case); Traumatic Hysteria (1 case).

February 6, 1914. Facial Palsy, Peripheral (1 case); Facial

[1] Report of Clinical Service Dr. G. M. Hammond, Post-Graduate Hospital and Medical School for 1914.

Palsy, following Mastoid Operation (1 case); Exophthalmic Goitre (1 case); Cerebrospinal Syphilis (1 case).

February 11, 1914. Neurasthenia (1 case); Meningomyelitis (1 case).

February 13, 1914. Manic Depressive, Depressed Stage (1 case); Hysteria (1 case); Tabes (1 case).

March 25, 1914. Exophthalmic Goitre; Multiple Sclerosis; Neurasthenia in High Grade Imbecile.

April 1, 1914. Paramyoclonus Multiplex; Acute Melancholia; Neurasthenia.

April 8, 1914. Exophthalmic Goitre; Myxedema; Multiple Sclerosis; Paramyoclonus multiplex.

April 17, 1914. Cerebrospinal Syphilis, Hemiplegic Type, Trombotic (1 case); Recurrent Melancholia (2 cases); Progressive Muscular Atrophy (3 cases).

April 22, 1914. Chorea.

April 24, 1914. Multiple Neuritis, Motor; Progressive Muscular Atrophy; Cerebral Hemiplegia, Child; Mental Defective.

April 29, 1914. Anxiety Neurosis (4 cases).

May 1, 1914. Epilepsy (3 cases).

May 13, 1914. Chorea (3 cases).

October 14, 1914. Progressive Muscular Atrophy (1 case); Multiple Sclerosis (hospital case); Epilepsy (showing Petit mal).

October 21, 1914. Bell's Palsy (1 case); Chorea (1 case); Hyperthyroidism (1 case); Progressive Muscular Atrophy (1 case).

October 28, 1914. Anxiety Neurosis (4 cases); Petit mal (1 case).

November 6, 1914. Multiple Neuritis (1 case); Anxiety Neurosis (4 cases); Progressive Muscular Dystrophy (1 case).

November 11, 1914. Chorea (2 cases); Myoclonus multiplex (1 case); Epilepsy (2 cases); Anxiety Neurosis (1 case); Neurasthenia (1 case).

November 20, 1914. Epilepsy (3 cases).

November 25, 1914. Epilepsy (2 cases); Bell's Palsy (1 case); Brachial Neuritis (1 case).

December 4, 1914. Hemiplegia (2 cases); Idiocy (1 case); Nerve Injury (1 case); Epilepsy (1 case).

December 9, 1914. Dementia Præcox (1 case); Epilepsy (1 case); Chorea (1 case); Habit Spasm (1 case).

December 16, 1914. Facial Spasm (1 case); Facial Paralysis (1 case); Tic Douloureux (1 case); Neuritis Right Arm (1 case).

Adj. Prof. S. E. Jelliffe.

January 9, 1914. Neurolipoma (1 case); Internal Secretions for outline of Psychoanalytic Study.

January 16, 1914. Anxiety Neurosis (2 cases); Second Lecture in series on Psychoanalytic Study.

January 23, 1914. Anterior Poliomyelitis (1 case); Anterior Poliomyelitis, Intra-uterine (1 case); Manic Depressive Psychosis (1 case); Compulsion Neurosis (2 cases).

February 27, 1914. Cerebrospinal Syphilis, (*a*) Congenital Type (1 case); (*b*) Tabetic Syndrome (2 cases).

March 6, 1914. Cerebrospinal Syphilis, Tabetic Syndrome (3 cases), Midbrain Type (1 case), Hemiplegic Syndrome (1 case); Congenital Syndrome (1 case).

March 13, 1914. Cerebrospinal Syphilis, Neurasthenic Syndrome (4 cases); Epileptic Syndrome (1 case), Midbrain Lesion (1 case); Hemiplegic Syndrome (1 case); Anxiety Neurosis Syndrome (1 case).

May 20, 1914. Multiple Sclerosis.

May 22, 1914. Mixed Thalamic Syndrome.

July 10, 1914. Tic Douloureux (1 case); Psychogenic Tic, Defense Reaction (2 cases).

September 11, 1914. Introduction to Psychoanalytic Technique.

September 16, 1914. Psychoanalysis: Concept of Libido, of Sexuality, of Repression.

September 18, 1914. Sexual Theories and Significance.

September 23, 1914. Neurasthenia (1 case); Anxiety Neurosis; Compulsion Neurosis; Hysteria.

September 25, 1914. Dreams.

September 30, 1914. Dream Mechanisms.

October 2, 1914. Compulsion Neurosis.

October 16, 1914. Spasmodic Torticollis (1 case); Cerebrospinal Syphilis with Superimposed Psychogenic Syndromes (2 cases).

November 4, 1914. Cerebrospinal Syphilis.

November 13, 1914. Cerebrospinal Syphilis.

November 18, 1914. Spasmodic Wry Neck; Psychoanalysis.

November 27, 1914. Psychoanalysis; Hysteria (1 case); Anxiety Neurosis (1 case).

December 11, 1914. Compulsion Neurosis.
December 18, 1914. Dreams.

Dr. C. N. Haskell.

January 2, 1914. Tabes (1 case); Spastic Paraplegia (1 case); Hemiplegia (1 case).
January 30, 1914. Hysteria, Functional Neurosis (1 case); Traumatic Neuritis (2 cases); Toxic Neuritis, Progressive Muscular Atrophy (1 case).
February 4, 1914. Bell's Palsy (2 cases); Case for Diagnosis.
March 4, 1914. Arm Pains (1 case); Midbrain Tumor (1 case).
March 18, 1914. Birth Palsy (1 case); General Paresis (1 case).
April 3, 1914. Facial Palsy (6 cases).
May 6, 1914. Facial Palsy (7 cases); Brachial Neuritis (1 case); Mental Defective (1 case).
July 8, 1914. Chorea (1 case); Psychosis, Traumatic (1 case).
July 15, 1914. Facial Paralysis (3 cases); Sciatica (1 case); Musculo-Spinal Neurosis (1 case).
July 17, 1914. Hemiplegia (3 cases); Spasmodic Wry Neck (1 case); Hysteria (2 cases).
July 22, 1914. Chorea (1 case); Thrombosis (1 case); Arteriosclerosis (1 case).
July 24, 1914. Tabes (1 case).
July 29, 1914. Hemiplegia (1 case); Anxiety Neurosis (1 case).
July 31, 1914. Chorea (1 case); Hysteria (1 case).
August 5, 1914. Epilepsy (2 cases).
August 7, 1914. Hysteria (1 case); Cerebellar Ataxia (1 case).
August 12, 1914. Facial Paralysis (2 cases); Birth Palsy (2 cases); Multiple Sclerosis (1 case); Simulating Paresis (1 case).
August 14, 1914. Multiple Sclerosis (1 case).
August 19, 1914. Headache (6 cases).
August 21, 1914. Musculospiral Paralysis (1 case); Hysteria (1 case).
August 25, 1914. Pseudo-Muscular Hypertrophy or Progressive Muscular Dystrophy (1 case); Tabes (1 case); Hemiplegia (1 case).
August 27, 1914. Spastic Paraplegia (1 case); Hemiplegia (1 case).
October 23, 1914. Brain Tumor (1 case); Backward Child (1 case); Tabes (1 case).

December 30, 1914. Hemiplegia (1 case); Sciatica (1 case).

Dr. Barnes.

January 7, 1914. Anxiety Neurosis (2 cases).

March 11, 1914. Anxiety Neurosis (1 case); Manic Depressive Insanity (1 case).

April 15, 1914. Neurasthenia (1 case); Chorea Minor (1 case); Occupational Neuritis, Right Arm (1 case); Birth Palsy, Right Arm (1 case).

May 8, 1914. Aphonia (1 case); Paranoia (1 case).

May 27, 1914. Anxiety Neurosis (2 cases); Backward Child (1 case); Multiple Neuritis (1 case).

May 29, 1914. Chorea (2 cases); Anterior Poliomyelitis (1 case); General Paresis (1 case); High Grade Imbecile (1 case).

June 3, 1914. Neurasthenia (2 cases); Anxiety Neurosis (1 case); Occupational Neurosis (1 case); Cerebrospinal Syphilis (1 case); Cerebral Epilepsy (1 case); Hysteria (1 case).

June 10, 1914. Epilepsy (1 case); Anxiety Neurosis (1 case); Hysteria (1 case); Dementia Præcox (1 case).

June 12, 1914. General Paresis (1 case); Occupational Neurosis (4 cases).

June 17, 1914. Bell's Palsy (2 cases); Multiple Sclerosis (1 case); Tic Douloureux (1 case).

June 19, 1914. Tabes (1 case); Chorea (1 case); cerebrospinal Syphilis (1 case); Osteomyelitis (1 case).

June 24, 1914. Exophthalmic Goitre (1 case); Bell's Palsy (1 case); Sciatic Neuritis (1 case).

June 26, 1914. Dementia Præcox (1 case); Convulsive Tic (1 case); Chorea (1 case); Hysteria (1 case).

July 1, 1914. Dementia Præcox (1 case); High Grade Imbecile (1 case); Headache (1 case).

July 3, 1914. Multiple Sclerosis (2 cases); Involutional Melancholia (1 case); Neurasthenia (1 case).

September 2, 1914. Epilepsy; Feeble Minded Children (2 cases); Chorea; Neurasthenia (2 cases).

September 4, 1914. Dementia Precox (1 case); Presenile Depression (1 case); Juvenile Tabes (1 case).

October 7, 1914. Epilepsy (1 case); Chorea (1 case).

October 9, 1914. Anxiety Neurosis (2 cases); Backward Child (1 case).

October 30, 1914. Toxic Paraplegia (1 case); Involutional Melancholia (1 case).

December 2, 1914. Anxiety Neurosis (2 cases); Presenile Depression (1 case); Low Grade Imbecile (1 case).

Dr. Osnato.

February 18, 1914. Progressive Muscular Atrophy (4 cases); Epilepsy (4 cases).

February 25, 1914. General Paresis (2 cases); Dementia Præcox (1 case); Manic Depression (1 case); Anxiety Neurosis (1 case).

Statistics

The total number of patients on record for the year 1914 exceeds by nearly 500 the total number for the previous year. The number is 1,628, of whom 1,596 are available for this study. The total number of visits made is 7,446, exceeding also that of 1913, but with the same average of approximately five visits per person.

The distribution of visits throughout the months of the year is fairly uniform, though a difference is shown of 193 between the attendance in February, in which is recorded the smallest number, and that of November when the largest number appears. The attendance remained at a high level from May through October, increasing in that month to attain the highest number in November. September alone furnished an exception to this when the attendance fell somewhat but not so low as in the first two months of the year.

The routine which has been previously reported has been followed in the examination, registration of old and new patients and the recording of the histories. The former blank forms for mental and neurological status have been retained, as before reported.

Clinical Summary

As before the total number of patients falls into two groups. 157 are classed as non-neurological, while there are for this study 1,439 distinctly diagnosed as neurological and mental.

The first group is composed of 87 male and 70 female patients. It is proportionately a much smaller group than reported here last year. The second group comprises 764 males and 675 females, showing again an increase in the number of male patients over the female patients, which was observed in 1911 and 1912, though in 1913 the women patients outnumbered the men.

We have attempted to follow as last year the classification according to the manifestation of disturbances in the three spheres of mental and nervous activity, psychical, sensori-motor and vegetative. Making a loose division, which is unavoidable since we deal with no hard and fast divisions, we may divide the 1,439 patients into 633 psychical disorders and 807 which manifest themselves more distinctly upon the sensori-motor and vegetative levels.

Mental Disorders (Psychical Level)

The better understanding of the interaction of the mental or psychical and the somatic disorders through which its activity manifests itself gives a much broader basis on which to classify the various disorders which present themselves for treatment in this department, at the same time that they exclude a rigid distinction in classification. This form of classification recognizes more clearly the overlapping of various forms because it discovers a common psychogenic basis concerned in the production of symptoms.

Moreover it includes in the term mental those borderline cases which the narrow clinical use of the term mental at one time ruled out. Both the clinical work and the instruction of the lecture room aim at this broader recognition with the greater diversity of clinical forms which this implies and a broader scope for directed therapeutic effort. We seek therefore to offer to a larger and increasing variety of disorders, many of which formerly received scant attention, better understanding and a place in practical therapy for the community, besides adding a far wider field for investigation of disorders of the psychical life as of equal importance with the strictly neurological field of investigation.

The Feeble-Minded Group

This is a small group in numbers but the patients presented here have received the usual special attention directed to their examination and improvement as far as possible. The classification of the number included in this group, thirty-seven in all, is as follows:

	Male	Female	Total
Idiocy	1		1
Mental defection	13	6	19
Mental retardation	4	1	5
Constitutional inferiority		3	3
Stigma of degeneration		1	1
Feeble-mindedness	4		4
Feeble-mindedness congential lues		1	1
Imbecility		3	3
	22	15	37

Neuroses and Psychoneuroses

We follow as heretofore the classifications based upon the principles of psychoanalysis and attempt to carry out the treatment according to the same principles.

Neurasthenia Group.—The limitations in facilities for intensive study of many of our cases have necessitated the retention of this rather indefinite term for a group of patients suffering from nerve fatigue of toxic or infectious origin or due to some other immediate precipitating cause. Where a deeper investigation is possible these patients fall under groups more exactly defined. As this group stands here it includes two hundred and twelve patients, one hundred and thirteen male and ninety-nine female.

Anxiety Neurosis.—Under this group belong those patients who manifest acute conditions of anxiety states of definite character varying from insomnia, general irritability, apprehension and marked emotional contrasts of temper or of depression and exaltation to the more physical manifestations such as palpitations, asthmatic chokings, digestive disturbances, diarrhea, vertigo, and the like. They are usually traceable to sexual maladjustment in the stricter sense.

Such cases do not necessarily call for a protracted psychoanalysis but are amenable to the application of the psychoanalytic principles of readjustment in a few visits. This group comprises seventy-three men and one hundred women, a total of one hundred and seventy-three.

Hysteria Group.—This group is defined by the conception of the conversion of mental conflicts into physical symptoms. Though they involve a patient investigation extending over some considerable time, they offer an important field for the successful application of the psychoanalytic therapy to the discovery and readjustment of these mechanisms. One hundred and four patients, thirty-six male and sixty-eight female, belong in this important group.

Compulsion Neurosis.—This name is applied to a group of sufferers from an underlying compulsion which manifests itself in a variety of ways. These may take the form of tics, torticollis, stuttering, alcoholism, drug addiction or of a more purely psychical phenomenon, the compulsive character of which is realized by the sufferer alone. Each form is traceable by psychoanalysis to some underlying psychical cause, the discovery of which leads to a better adjustmen or "abreaction" of the complex which it represents and therefore relief from the compulsive symptom. Twenty-two males and nine females, thirty-one in all, are reported in this group.

Mixed Psychoneuroses.—It is indicative of the broader attitude of the classification which we have used, as well as of its greater adaptability to actual conditions of mental illness and clinical needs that it has no hard and fast boundaries. It recognizes the necessary overlapping of various pathological conditions and the complexity both of symptomatology and of the complexity of underlying causes. The aim of psychoanalysis is thus due to reach the broad personality and work toward its readjustment rather than to hope to reach real results by following out any one limited classified line of investigation or treatment.

Classifications become therefore merely guiding lines and under them we must allow for a large group of mixed psychoneuroses, the clinical pictures of which are complex and not clearly defined but which offer a fruitful field for psychoanalytic therapy. This group then numbers nineteen males and twenty-one females, a total of forty.

The psychoanalytic work for the year has been carried on by Drs. Beatrice Hinkle and S. Blumgart. It has proved itself a valuable means of approach in the understanding of disturbances otherwise difficult or impossible of approach or of complete understanding of their actual meaning and potency. The number of patients who present themselves to this service of the clinic and the readiness with which they respond to the psychical approach to their difficulties attest the value of this treament.

Psychoses

Toxic Psychoses.—The same adaptability of a broader classification to actual human conditions admits of no fixed boundary between the preceding groups and the psychoses, nor of an absolute delimitation within this group. The five male patients therefore who manifested mental disturbance due to alcohol or other drugs have already been included among the compulsive neurosis group.

Dementia Precox Group.—Twenty males and eight females, a total of twenty-eight, have been placed in this group.

Paranoia.—Two male patients appear in this group.

Melancholia.—It is difficult here to determine within the brief period of observation of clinical service whether these are true cases of melancholia or whether they belong to the anxiety type of neurosis. We include here fourteen women, one with puerperal melancholia and thirteen with involutional melancholia. One man is also noted with acute melancholia, and three men and four

women suffering from depression, making a total in all of twenty-two.

Manic-Depressive Psychosis.—Five males and two females, seven in all, are reported in this group.

Senile and Presenile Psychoses.—One woman is reported under the former group and one man under the latter, a total of two patients.

The symbolic level disorders may be tabulated as follows:

Diagnosis	Males	Females.	Total
Feeble-minded group	22	15	37
Neurasthenia group	113	98	212
Anxiety neurosis	73	100	173
Hysteria group	36	68	104
Compulsion neurosis	22	9	31
Mixed psychoneuroses	19	21	4
Dementia præcox group	20	8	28
Paranoia	2		2
Melancholia group	4	18	22
Manic depressive	5	2	7
Senile and presenile	1	1	2
Syphilitic psychoses: cerebral syphilis	31	9	40
	348	350	698

Sensori-Motor Level Disorders.

The threefold division of the nervous system and its disorders to which we adhere brings us next to the disorders of the sensori-motor level. 653 patients are here included.

Cranial Nerves

Bell's Palsy.—Eleven patients presented this condition, seven males and four females.

Trigeminal Neuralgia.—Eight males and eleven females, nineteen in all, suffered from this condition.

Facial Neuralgia.—Two males and two females, four patients, presented this condition.

Ménière's Disease.—Eight patients presented this disorder, three males and five females.

Tic Douloureux.—Five patients, two males and three females, suffered from this condition.

Seventh Nerve Palsy.—Twenty men and eleven women, a total of thirty-one patients, suffered from this disorder.

Paralysis of Vocal Cords and Laryngeal Paralysis.—One male suffered from the first condition, while one female showed a left recurring laryngeal paralysis.

Cerebral Disorders

328 patients, 199 male and 129 female patients, are reported here, presenting a variety of cerebral disorders.

Chorea.—Twenty-eight males and thirty-five females, a total of sixty-three patients, are recorded under this head.

Arteriosclerosis.—Fourteen male and eight female patients present this condition, twenty-two patients in all, one male presenting this as a result of alcoholism.

Cerebral Hemorrhage.—One male and one female are recorded here, the latter presenting an aphasia as a result.

Cerebral Tumor.—Three males and two females, five patients, suffered from this disorder.

Epilepsy Group.—There must still be included here the broad variety of disorders which follow the epileptic mode of discharge. It comprises therefore fifty-four patients, thirty-two males and twenty-two females, who may be classed under genuine epilepsy, and two females manifesting Jacksonian epilepsy.

Cerebrospinal Syphilis.—Twenty-nine males and nine females, thirty-eight patients in all, manifested this disorder.

Lues.—This condition was present in four patients, three male and one female.

This material may be presented as follows:

General Paresis.—Two males presented this condition.

	Male	Female	Total
Bell's palsy	7	4	11
Optic neuritis (alcoholic)	1	0	1
Trigeminal neuralgia	8	11	19
Facial neuralgia	2	2	4
Tic douloureux	2	3	5
Seventh nerve palsy	20	11	31
Vocal cord and laryngeal paralysis	1	1	2
Chorea	28	35	63
Arteriosclerosis	14	8	22
Cerebral hemorrhage	1	1	2
Cerebral tumor	3	2	5
Epilepsy	32	22	54
Cerebrospinal syphilis	29	9	38
Lues	3	1	4
Tabes and locomotor ataxia	3	1	4
General paresis	2	0	2
Multiple sclerosis	11	4	15
Polioencephalitis	3	0	3
Paralysis agitans	4	1	5
Little's disease	1	0	1
Paresthesia	0	2	2
Hemiplegia and paraplegia	24	11	35
	199	129	328

Polioencephalitis.—Two male patients presented this condition and one male a condition of encephalitis.

Paralysis Agitans.—Five cases of this were presented, four male and one female.

Little's Disease.—One male manifested this condition.

Paresthesia was present in two females.

Hemiplegia and Paraplegia.—Thirty-five patients, twenty-four male and eleven female, presented the former condition and one male the latter condition.

Spinal Cord and Peripheral Nerves

Spastic Paraplegia.—Four males manifested this affection, and one female, the latter case resulting from a syphilitic myelitis.

Peripheral Palsies.—Six males and two females manifested these palsies of the peripheral nerves, eight patients in all, besides one male manifesting peripheral nerve injury.

Birth Palsy, Infantile Palsy.—Five females manifested the first affection, two males the latter, a total of seven patients.

Syringomyelia.—One male presented this condition.

Transverse myelitis.—One female is reported here.

Sacro-Iliac.—One male and two females, three patients, are reported with this condition.

Musculospinal Paralysis.—Four males present this condition.

Anterior Poliomyelitis.—Six males and two females present this condition and one male a congenital form, making in all eight patients.

Occupation Neurosis.—Forty-three patients manifest this disorder, twenty-eight males and fifteen females.

Neuralgias and Neuritides.—Six males and nine females, fifteen patients, suffered from various neuralgias, and one hundred and twenty men and eighty-six women, two hundred and six patients, from various neuritides. Of the latter forty-four males and sixteen females, fifty-nine in all, manifested brachial neuritis, thirty-two males and sixteen females, forty-eight patients, were cases of sciatic neuritis, six males and four females, ten patients, were of traumatic origin, four patients, one male and three females, manifested a lumbar neuritis, three males and two females, five patients, were cases of alcoholic origin, one of the males manifesting an optic neuritis, seven males and sixteen females, twenty-three patients, were suffering from multiple neuritis, while twenty-seven males and twenty-nine females, fifty-six patients, showed various distribution of the neuritis.

Tabes and Locomotor Ataxia.—Three men and one woman, four patients, revealed this condition.

Multiple Sclerosis.—Eleven male and four female, fifteen patients, suffered from this condition.

Progressive Muscular Atrophy.—Nine males manifested this disorder.

Progressive Muscular Dystrophy.—One male presented this condition.

These cases may be summarized as follows:

	Male	Female	Total
Spastic paraplegia	4	4	5
Peripheral palsies	6	2	8
Birth palsy, infantile palsy	5	2	7
Syringomyelia	1	0	1
Transverse myelitis	0	1	1
Sacro-iliac	1	2	3
Musculospiral paralysis	4	0	4
Anterior poliomyelitis	6	2	8
Occupation neurosis	28	15	43
Neuralgias and neuritides	126	95	221
Tabes and locomotor ataxia	3	3	4
Multiple sclerosis	11	4	15
Progressive muscular atrophy	9	0	9
Progressive muscular dystrophy	1	0	1

Vegetative System Level

In this grouping we include those disorders which are due to disturbances in the glandular secretions or in the non-nervous organs and tissues, which are however all under the control of this level of nervous activity.

Arthritis.—Six patients, three male and three female, are reported here.

Osteomyelitis.—One male manifested this affection.

Thyreopathies.—Six females presented the condition of hyperthyroidism, and one male and three females, four patients, are reported under *exophthalmic goitre.*

Headache and Migraine.—Seventeen males and twenty-two females, thirty-nine patients, are reported suffering from headache of varied origin, and eleven males and seventeen females, twenty-eight patients, from migraine.

Lumbago.—Thirteen patients, eleven males and two females, suffered from this condition.

Raynaud's Disease.—One male manifested this condition.

Vasosconstrictor Paralysis.—Two males manifested this disorder.

Myositis and Myalgia.—Two males and three females, five patients, suffered from the former affection, and three males and three females, six patients, from the latter.

These disorders may be tabulated as follows:

	Male	Female	Total
Arthritis	3	3	6
Osteomyelitis	1	0	1
Thyreopathies	1	9	10
Headache and migraine	17	22	39
Lumbago	11	2	13
Raynaud's disease	1	0	1
Vasoconstrictor paralysis	2	0	2
Myositis and myalgia	5	6	11
	41	42	83

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REPORT OF A BRAIN TUMOR IN A CASE CLINICALLY CONSIDERED TO BE PARESIS*

By Lawson G. Lowrey, A.M., M.D.

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This case is reported because of the rarity of brain tumors among the insane; because of the unusual location of the tumor, and because of the erroneous diagnosis of paresis made in this instance.

The case is that of a male, Clinical No. 17643, Path. No. 1764. An illiterate French-Canadian, with onset of mental trouble at 41. The family history is negative for nervous and mental diseases and cancer. Patient a blacksmith; Catholic; married, six children. Married life happy. Naturally quiet. Slight drinker. Never intoxicated. Never arrested. No history of trauma or serious illness. Psychosis: From 1911 to time of admission in October, 1913, at age of 43, gradually failed. Did not work in this period. Said to have had a "shock" in 1912, following which he was unconscious for 2–3 minutes. Following this he had an unconscious spell lasting 3–5 minutes about once a month. For some months speech somewhat thick and indistinct. Never irritable. Became somewhat restless at night, untidy, and memory gradually failed. Never expressed any delusions. For two weeks was very weak and had to be cared for in bed. Complained of pains in head and again all over body. No venereal history obtained.

Physical Examination.—5′ 6″ tall. 136¼ lbs. Hair gray. Sallow complexion. Mucous membranes pale. Tongue tremulous. Facial asymmetry. High and narrow palate. Lungs negative. Heart normal except that sounds are distant. Pulse 82. Moderate thickening of peripheral vessels. Blood pressure 135. Abdomen negative. Wassermann on blood serum positive, on spinal fluid unsatisfactory. Fluid contained blood, hence other laboratory tests unreliable.

Complained of no pain or headache. Eye movements normal. Arcus senilis. Pupils irregular, unequal, react sluggishly to light and distance (equal impairment in reactions). Vision not determined. Coöperated poorly in sensibility tests, so that little was made out. No tenderness of large nerve trunks. Could not recognize objects "due to dementia."

Knee jerks absent. Arm reflexes normal. Cremasteric and ab-

* A contribution to the William Leonard Worcester Series of Danvers State Hospital Papers, presented November 19, 1915.

dominal reflexes absent. Incontinent. Sways in Romberg's position. Marked tremor of fingers and tongue. Slept a great part of the time.

Mental Examination.—Dull and stupid. Remained quietly in bed. Contented. Untidy. No spontaneous speech. Responses relevant and coherent. Some motor speech defect. Knew the month, but not the year. In a hospital but did not know where. School knowledge practically nil. No evidence of hallucinations. Memory much impaired. No tendency to fabricate. Could not be made to understand the association tests. Expressed no delusions. No insight. Thought he was sick, but mind all right. Indifferent.

Oct. 28: Quiet, dull, stupid, physical condition poor. Nov. 1: Quiet, dull, stupid, demented, speech defect, untidy. Nov. 4: Brighter and more responsive, disoriented, memory impaired. Nov. 12: No delusions. Disoriented for place and partially for time. Contented. Nov. 14: Presented at staff meeting with a diagnosis of general paresis, to which all agreed. December: Difficult in walking. Falls out of bed. Staggering gait. Headache and toothache. Eyesight dull. No delusions or hallucinations. Jan., 1914: Convulsions, not serious. Failing. Feb.: Quiet, failing, no relevant responses. Aug.: Demented. Excited and angry at times. Marked expectoration. Spoon fed. Oct. 9, 1914: Gradually failed for two weeks. Had a series of convulsions from which he did not rally, and died today.

Autopsy.—One and a half hours post mortem. Contractures at hips and knees. Atrophy of calves. Trochanteric and sacral decubitus. Bloody blebs and discoloration and maceration of the skin of the left hand. Pupils unequal. Axes of the eyes directed outward. Pyorrhea. Abdominal organs in good position. Adhesive pleuritis. Broncho-pneumonia. Slight fibrosis of heart muscle. Fatty liver. Diffuse nephritis. Small colloid cyst in thyroid. Head: Calvarium not thickened. Somewhat dense in frontal region. Dura not thickened; not adherent to calvarium or pia. Pia arachnoid not perceptibly thickened anywhere. Considerable quantity of fluid in the sub-arachnoid spaces. Basal vessels not sclerotic. Pituitary small and flat; sella turcica shallow. Brain: Wt. 1,560 g. Pons and cerebellum 180 g. Floor of the fourth ventricle shows a faint granular ependymitis. Cerebellum slightly softer than normal. Sections negative.

Hemispheres: Each temporal pole fluctuant. Tuber cinereum bulging and dark in color. Just in front of the anterior extremity of the corpus callosum there is, in the left hemisphere, a white, firm, raised area, of irregular shape. This is firmer than the surrounding tissue, is whiter than the gyri, but has much the physical characteristics of a gyrus. Median sagittal section reveals a large irregular grayish mass, containing numerous soft, reddish hemorrhagic areas. This has invaded the corpus callosum and both thalami. To a large extent it fills up the third ventricle, and it more or less blocks up the lateral ventricles as well—filling thus all of the aperture below the corpus callosum (cf. Figs. 1 and 2). The

ventricles contain bloody fluid, and show a marked granular ependymitis. The irregular mass noted on the median aspect of the left hemisphere is apparently not connected with the larger and deeper mass.

The brain was hardened without further sectioning in 10 per cent. formalin, and after one month was photographed in external view, both before and after stripping the pia. Frontal sections were then made. The left hemisphere was longer, deeper and narrower

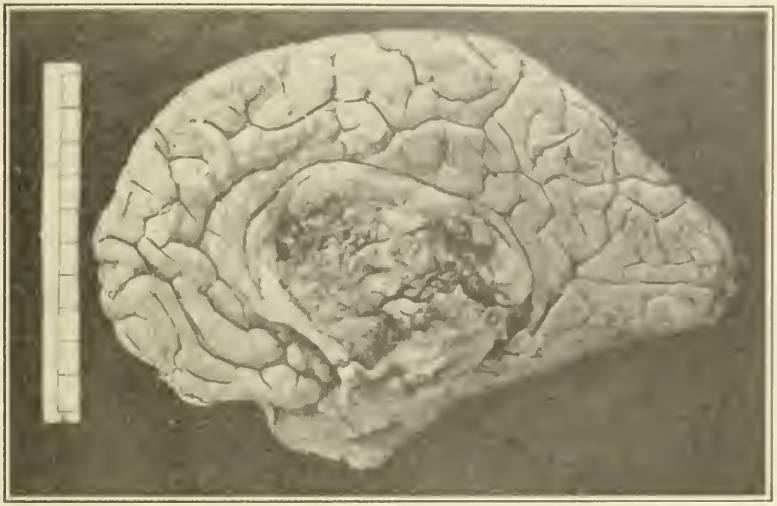

FIG. 1. Extent and relations of tumor mass on the mesial surface of the hemisphere.

than the right. The left lateral ventricle was larger than the right in cross section—that is, there was unequal internal hydrocephalus. Tumor mass larger on right than on left. In certain areas, as just above the thalamus, the entire right ventricle was filled by it. Where it invaded the ventricular walls, it was of looser texture. Corpus callosum much corroded. On the right side, a whitish mass arising behind the thalamus extends for a short distance on the median surface of the hemisphere. Descending horn of left lateral ventricle contains a large blood clot in addition to bloody fluid. Gyrus dentatus poorly marked on left side. Tumor mass gray, lobulated and contains numerous hemorrhagic points of varying size. Above the posterior horn of the lateral ventricles, the white matter is soft.

Figs. 1 to 3 give a good idea of the extent and relations of the tumor. It is apparently one arising in the third and lateral ventricles but just where, it is impossible to say.

Microscopical examination of the body organs confirms the diagnosis made for them. Examination of the cortex and spinal cord *fails to reveal any evidence of a paretic process.* There is no perivascular exudation, no serious disturbances of the cytoarchitectonic picture, no great changes in the nerve cells. There is ap-

parently a certain paucity of nerve cells, with some increase in the neuroglia, but such changes are notoriously hard to judge. There are a great many cells, presenting themselves as long drawnout rods, with a nucleus located somewhere near the middle. Apparently there is a slight increase in the number of small vessels. The cells for the most part stain deeply and more or less homogeneously, but there is no evidence of grave alterations. No satellitosis. These statements are based on the examination of sections from the following areas, all stained with cresyl-violet: frontal, precentral, postcentral, temporal, calcarine, gyrus dentatus, lenticular nucleus

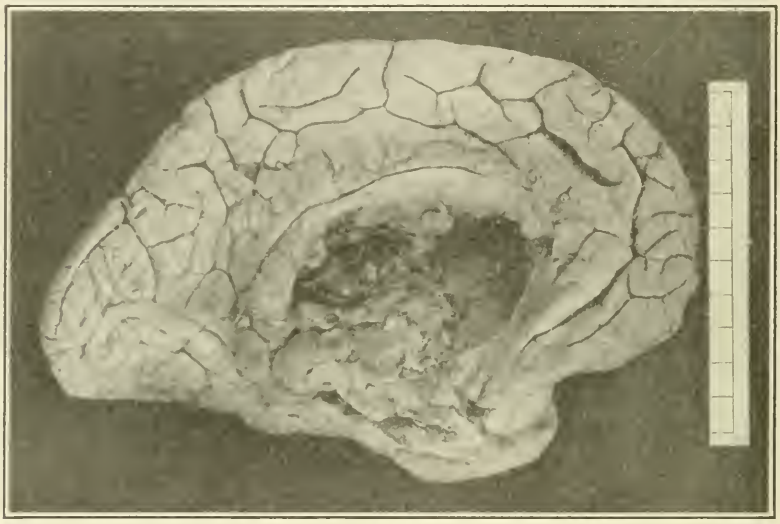

Fig. 2. Tumor on mesial surface of the brain hemisphere.

and thalamus of each hemisphere, three levels of the cord and Gasserian ganglion. With phosphotungstic acid hematoxylin, the cortex appears to have an unusually dense net work of neuroglia fibrils. Various areas of the tumor were examined in sections stained by the following methods: cresyl-violet, Weigert's iron hematoxylin and picro-fuchsin, phosphotungstic acid hematoxylin, Weigert and Marchi. The tumor is a very cellular one, at some points being almost purely cells. Intermingled with the cells there is a varying proportion of fibers, which stain blue with phosphotungstic hematoxylin and pale green with picro-fuchsin. The cytoplasm of the cells is for the most part faintly stained, but where the outlines of a cell can be definitely made out, it is found to be angular, and in close connection with the fibrils. The nuclei are well preserved. For the most part they stain palely, with well-marked chromatin granules and intranuclear network. Their shape varies. Some are oblong; these are more deeply stained: while the remainder are oval or irregular, and larger than the oblong. In certain sections the nuclei are aggregated into a sort of rosette formation. In some

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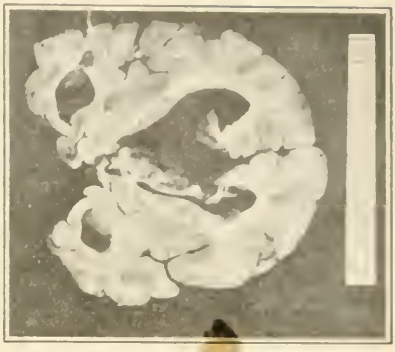

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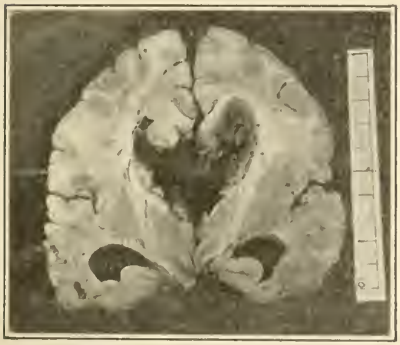

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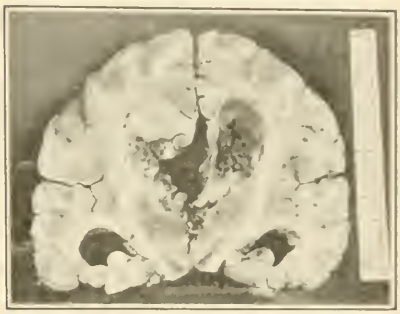

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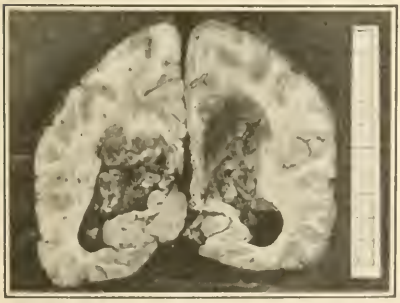

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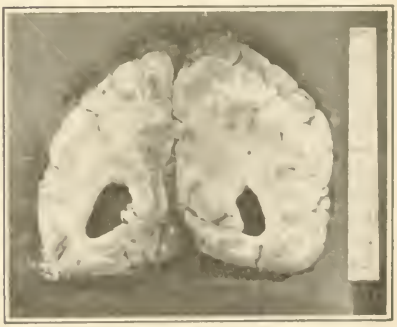

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FIG. 3. Coronal sections to show the extent and relations of the tumor. Note the invasion of the corpus callosum and walls of the ventricles.

areas the cells are very closely packed and there are almost no fibers. A few large cells appear to be full of vacuoles. There are numerous capillaries with occasional hemorrhagic and necrotic areas.

The tumor is evidently a glioma, arising probably in the third ventricle, and extending into the surrounding structures. It attained, in the course of three years, a relatively large size, and invaded a number of important parts. It is very striking that a tumor invading such important structures should have produced so few symptoms. The chief symptoms were the gradual decline of energy, memory and attention, and the cardinal signs of brain tumor were never present to a striking degree. The correlation between symptoms and lesion in this case is almost impossible.

Discussion.—Tumors are of relatively rare occurrence in brains of the insane; thus, there have been but 26 instances of brain tumor in 1,860 Danvers' autopsies. Blackburn (1) was able to report but 29 cases among 1,642 autopsies in 1903.

Intraventricular tumors are apparently rather rare. Thus, Starr (2) presents (Table XIII) statistics on the location of brain tumors in 600 cases. This table shows that 61 tumors, or 10 per cent., were found in the basal ganglia and lateral ventricles. Of these 61 tumors, 17 were tuberculous and 1 was gummatous, leaving 43 tumors which might be regarded as independent of infections. He further states (page 594) that only 20 cases of tumor of the corpus callosum had been reported up to 1913. To these may be added a case reported by Iaracoff (3).

Weisenburg (4) in 1910 reported 30 cases of tumor of the third ventricle; 3 of his own and 27 obtained by careful survey of the literature. Of these, 3 simulated paresis clinically. Two of these were reported by Mott and Barratt (5), who state that the resemblance to paresis was superficial. One of the cases was regarded as an epileptic and general paretic at different times. Weisenburg states that there are no specific mental symptoms for lesions of the third ventricle, but that such symptoms as occur are due to pressure on the cortex from internal hydrocephalus. The impression is that drowsiness, apathy and dull mentality (or even greater impairment) are likely to be found with such tumors. Ataxia of the cerebellar type was found in the majority of cases.

Gordon (6) in 1914 reported a case of tumor of the basal ganglia of the left hemisphere destroying the larger part of the caudate and lenticular nuclei and also the adjacent part of the optic thalamus and extending downward to the base. The resemblance to paresis was very striking and a lumbar puncture was performed. The spinal fluid Wassermann was negative, but there was a lymphocytosis.

Pollock (7) reported a case of tumor of the third ventricle extending as a polyp through the left foramen of Monro.

One of Blackburn's cases (No. 1237) showed a tumor mass apparently originating in the region of the corpora quadrigemina and thence extensively invading the brain. It extended along the superior cerebellar peduncles and formed masses in the cerebellum: forward into the cerebral hemispheres and involved the basal region at the junction of the occipital and temporal lobes. It projected into the posterior horn of the lateral ventricle as fungoid masses and some fungoid masses extended along the lateral walls of the third ventricle. This is figured and described as a round cell sarcoma.

The exact origin of the tumor reported in this case cannot be definitely determined. It fills up most of the lateral ventricles posterior to the plane of the optic chiasm, extensively involves the corpus callosum, invades the walls of the lateral ventricle and of the third ventricle. It does not, therefore, present any specially marked similarity to any of the tumors referred to above. One may surmise that it probably originated in the third ventricle. It is, to say the least, an unusual type of ventricular tumor since these are practically always described as being either sarcomatous or some variety of fibroma; while this is apparently a very cellular glioma, or, at best, a glio-sarcoma.

The significance of the positive blood and doubtful spinal fluid Wassermann tests is uncertain. No lesions were found which could be laid to a specific infection. The tumor is certainly not a gumma and, as explained above, there is no evidence of paresis in the sections of the cortex.

This case emphasizes again the importance of a *satisfactory* and *complete* examination of the spinal fluid in all cases in which paresis is suspected. Had the unsatisfactory examination in this case been repeated there is every reason to believe that the erroneous diagnosis would not have been made.

Summary

1. This paper presents a study of a case of glioma involving the third and posterior portion of the lateral ventricles and the corpus callosum. The case was diagnosed as paresis but no evidence of paresis was found in the microscopical study of the cortex.

2. The tumor is somewhat unusual in type for its location, as tumors in this region are usually sarcomas or fibromas, while this is a glioma or at most a glio-sarcoma.

3. As in many other reported cases of tumors in this region no definite symptom complex appeared.

4. This case emphasizes the importance of satisfactory spinal fluid examinations in all cases in which paresis is suspected.

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DILATATION OF THE LATERAL VENTRICLES AS A COMMON BRAIN LESION IN EPILEPSY*

By D. A. Thom, M.D.

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Dilatation of the lateral ventricles has always impressed me as being a very common abnormality of the brains in epileptic subjects, and although for a long time it has been well known that convulsions were frequently associated with internal hydrocephalus, especially in those early cases where the dilatation began before cranial synostosis had been completed, I have failed to find ventricular enlargement mentioned in the literature as a common finding in the pathology of epilepsy.

Until recently I have had to content myself with the impressionistic idea relating to dilated ventricles, as many of the brains removed at the Monson State Hospital were preserved entire for photographic work and numerous brains have been sent to the neuropathological department of the Harvard Medical School for total brain sections and intensive study. Therefore, it has been necessary to wait until a sufficient number of consecutive autopsies be performed before beginning this study.

Since January, 1913, I have collected from my autopsy material the brains of 75 epileptic subjects, the results of 82 consecutive postmortem examinations, and it is upon a personal analysis of this material that the statistics have presented are founded.

Fifty-seven, or 76 per cent., of this group presented gross brain lesions. This is 13 per cent. higher than was reported in a previous paper, "No. 1, An Anatomical Search for Idiopathic Epilepsy," but this higher percentage of grossly abnormal brains may be accounted for by more thorough dissection in the search for dilated ventricles. Thirty-one of these 57 cases presented cortical lesions as well as dilated ventricles; 16 showed lesions of the cortex alone, while the remaining 14, with a normal-looking cortex, had dilated lateral ventricles.

Of the entire 43 cases revealing cortical lesions, the hind portion

* From the laboratory of the Monson State Hospital.

of the brain was by far the most frequently affected, especially the occipital lobes. The convolutional shrinkage in this region was often marked, and the appearance was that of an acquired condition rather than one of congenital origin. Next in order of frequency was the general cerebral gliosis, where the entire cerebrum appeared to be involved. Softenings were noted only six times, once being general, the other five times being focalized.[1] The rarity of soft brains was rather surprising when one considers that there were 29 cases of well-defined sclerosis of the basilar and cerebral vessels; also, one would expect to find cerebral hemorrhage frequent with these weakened vessels and high blood pressure, but in only two of the 75 cases was there evidence of arterial rupture. Gliosis and atrophy of one hemisphere alone was noted in eight cases, equally divided between the two hemispheres.

The dilated ventricle group, comprising total of 41 cases, or 54.6 per cent., would form the basis for a very interesting study. Twenty-seven of the brains in this group also had abnormalities of the cortex, which for the moment will be given preference over the dilated ventricles, as being the more likely pathological lesion of which the convulsions are symptomatic. The residue of 14 cases with dilated ventricles, where the cortex of the brain was not grossly abnormal but where the ventricular dilation was of such a degree as to leave no doubt of its abnormality, raises the question as to whether lesions affecting primarily the white matter may not be a factor in the production of epilepsy.

Perhaps there is no field in neuro-pathology which is so rich in gross pathological brain changes as that of epilepsy. Like the manifestations of the disease itself, the lesions are often of a spectacular character—yet, it is most difficult to state whether these lesions are the cause or effect of the convulsions, or whether they are in any way correlatable with the epilepsy.

I hope to be able, in the near future, to make some attempt at separating the "problematical cause lesions" from those that have been produced directly and indirectly by the disease itself, and then set aside a third group of lesions which, to my mind, are not related to the epilepsy in any way. This will necessitate a careful study of the case histories and intensive microscopical research.

The tables presented below show the age at onset of the convulsions in two groups of dilated ventricle cases, the first (Table *A*), the 27 cases with dilated ventricles and cortical lesions, the

[1] Thom & Southard, "No. 1, An Anatomical Search for Idiopathic Epilepsy," Review of Neurology and Psychiatry, October, 1915.

other (Table *B*), the 14 cases with dilated ventricles without cortical lesions.

Table *A*

Age of Onset First Convulsion	
Congenital cases	2
Between 1 and 5 years	6
Between 5 and 10 years	3
Between 10 and 20 years	6
Between 20 and 30 years	2
Between 30 and 40 years	1
Between 40 and 50 years	5
Between 50 and 60 years	1
Over 60 years	0
Unknown	1
	27

Table *B*

Age of Onset First Convulsion	
Congenital cases	1
Between 1 and 5 years	2
Between 5 and 10 years	0
Between 10 and 20 years	3
Between 20 and 30 years	0
Between 30 and 40 years	2
Between 40 and 50 years	3
Between 50 and 60 years	2
Over 60 years	1
	14

No doubt there would be something gained from an intensive study of these two groups of cases. The congenital and acquired lesions might be separated with some degree of accuracy, and more important yet is the character and location of lesions capable of producing convulsions as compared with those pathological changes produced by convulsions. I am not as yet willing to accept the theory of Gowers, who believes that "lesions of the cortex alone are capable of producing convulsions." Lesions of the cortex, associated with congenital internal hydrocephalus, no doubt are often secondary, while many of the cases of ventricular distention are acquired rather than congenital defects and cannot be attributed as the causative factor in the production of convulsions.

Of the 27 cases which belong to the group having both dilated ventricles and cortical lesions it will be noted that 17, or 63 per cent., had their onset before twenty years of age, as compared with 6 cases, or 43 per cent., of Group *B*, where there were no cortical lesions.

Excluding the alcoholic and syphilitic cases, the onset of convulsions after thirty years of age is not common. Here we find that 57 per cent. of the cases with epilepsy and dilated ventricles (no other gross lesion being present) have their onset after thirty years of age; there is just a suggestion here that if lesions other than those of the cortex are capable of producing convulsions, the nature of the pathological process is slow and the onset of the convulsions late.

Further speculation without intensive study would be fruitless. In closing, I would call attention to the frequency of ventricular dilatation in this series of epileptic brains—that in 14 of these cases

there was no other gross lesion present, although 76 per cent. of the entire group presented some gross lesion at autopsy. These lesions do not in all cases represent the cause of the epilepsy, and by further study they might be placed in one of three groups:

1. Those lesions to which the epilepsy might reasonably be attributed.

2. Those lesions which might reasonably be explained by the epilepsy.

3. Those lesions which are neither the cause nor results of epilepsy.

Society Proceedings

CHICAGO NEUROLOGICAL SOCIETY

April 26, 1917

The President, Dr. Harold N. Moyer, in the Chair

THE CAUSE OF MUSCULAR ATROPHY FOLLOWING NERVE SECTIONS

By H. C. Stevens, M.D.

Dr. Stevens called attention to the evidence which has accumulated tending to show that some of the so-called atrophic changes occurring as the result of injuries to the nerves could not be strictly so classified. He reported experimental work performed upon dogs which he felt proved that the muscular atrophy following nerve section was due to the excessive fibrillary activity of the muscles which began from three to six days after nerve section. His experiments dealt with section of the hypoglossus nerve. After considering the theories which have been formulated to explain the atrophy of muscles following nerve section, he stated that in the light of the fact that fibrillary contractions are continuous through the period of atrophy and disappear only with a regeneration of the nerve, the rational treatment of the muscles would seem to be the administration of some chemical which would diminish the action of the muscle fibers.

Dr. Lewis J. Pollock asked Dr. Stevens how he explained the fact that we have no atrophy in cases where long-continued and rapid tremors, such as may occur in exophthalmic goiter and paralysis agitans, occur and also why it is that strychnia, which would inevitably cause an increase of muscular irritability and as its result an increase of fibrillary twitching, is of use in peripheral neuritis and lesions associated with atrophy; also why we do not have an atrophy in such diseases as central neuritis where fibrillary twitching may be constant and where the disease lasts over five days.

Dr. Meyer Solomon said that if the observations and conclusions of Dr. Stevens were correct, one must draw the conclusion that the lower motor nerve cells have an inhibiting and integrating action on the individual muscle fibers and muscle fiber groups, just as the higher nerve centers have an inhibiting, integrating and synthesizing action on the lower nerve centers. This means that when the lower centers are cut off from their direct connection with the muscles there is a cessation of their inhibiting action and, as a result, a free, unrestrained activity of the muscle fibers. The tremors in paralysis agitans and Huntington's chorea and the like are not of the individual muscle fibers or groups of fibers but of the entire muscles themselves, thus affecting the voluntary physiological muscle activity, whereas in Dr. Stevens' experiments we have a tremor or over-activity of the fibers themselves. It is interesting to note that as we ascend from the muscles to the various levels in the nervous sytem, we have higher integrations, and as we break down the centers of integration or inhibition there is an uncontrolled release of the lower types of activity.

Dr. Stevens, in closing, stated that the tremor observed in central neuritis, paralysis agitans and general paresis was the result of the incoördinating of muscle groups due to lesions in nerve centers. Phenomena of this sort are therefore, not comparable to the fine fibrillary contractions which occur in denervated muscles. Atrophy does not result in the diseases mentioned for the reason that the activity is not incessant. Furthermore, the pathology of the diseases mentioned by Dr. Pollock is not comparable to pathological conditions of experimentally denervated muscle, for the reason that the lower motor neurone is intact. In anterior poliomyelitis, on the other hand, in which the lower motor neurone is destroyed, fibrillar contractions known as myokymia have been observed.

REPORT OF CASES OF VERTEBRAL AND CORD TUMORS, WITH LANTERN SLIDE DEMONSTRATION

By Peter Bassoe, M.D.

Case I.—Chondro-sarcoma of fifth and sixth cervical vertebræ. A locomotive engineer, aged forty-three years, previously well, was seized with pain in the right arm while pulling hard on the lever in the summer of 1914. He kept at work but had some pain every day. He did not give up work until October, 1915, when the pain grew worse. The pain spread to the right side of the neck and during the last week of January, 1916, weakness in the right hand and in the right leg was noted. Then he rapidly grew weak in both legs and both arms and when first examined on February 7, 1916, there was complete paralysis of the right arm, partial paralysis of the left arm, and spastic paralysis of both legs. The sphincters were affected. Sensation was impaired or lost from the eighth cervical segment down. X-ray examination showed a mass in connection with the right side of the fifth and sixth cervical vertebræ. Two operations were performed. The tumor was cartilaginous, glistening on section and distinctly malignant, invading the spinal canal. The dura, which was completely encased by the tumor, was not opened. Histologically the tumor was a malignant chondroma. The patient remained paralyzed and died in July, 1916. Necropsy was not secured.

Case II.—Metastatic carcinoma of spine. Ordinary case of carcinoma of bodies of several thoracic vertebræ following carcinoma of the breast. The dura and cord were not invaded but adherent. There was no evidence of mechanical compression, so the paralysis below the level of the lesion and the ascending and descending degeneration in the cord must have been due to edema caused by the adhesions.

Case III.—Metastatic carcinoma of cord. A woman, aged forty-one years. A tumor in the left breast appeared in 1910 and was removed in February, 1913, when the axillary and cervical glands were affected. The patient was well until February, 1916, when she developed gnawing pain along the whole spine, and pain and weakness in the legs. Within a month she became paraplegic and developed urinary retention. The spinal fluid gave a positive globulin test and a cell count of only 2. X-ray examination of the spine was negative. On post-mortem examination a few weeks later no tumor was found in the vertebræ or dura, but the cord itself in the thoracic region showed carcinoma nests, especially in the posterior column, and the pia was also invaded posteriorly. At one place extensive softening of the cord had taken place. Attention was called to the rarity of such cord metastases as compared to the condition described in the preceding case.

Case IV.—Lipoma of sacral cord in connection with spina bifida occulta. A clergyman, fifty-two years old, with a mild form of congenital talipes, had

no nervous symptoms until the fall of 1911 when he developed numbness of the feet and precipitate micturition. When examined in January, 1912, the chief findings were absence of both ankle jerks and of the left knee jerk, the right knee jerk weak, bilateral Babinski sign, analgesia corresponding to the sacral and fifth lumbar segments, and on X-ray examination a cleft in the arch of the fifth lumbar vertebra. In January, 1916, he returned to the hospital on account of urinary incontinence and severe pyelonephritis. After a few days he died of uremia. There was a marked bulb-like expansion at the lower end of the cord. The cord substance constituting the conus was greatly distorted with only its ventral outline preserved, the rest being distributed in a large lipomatous mass. Ascending degeneration of the columns of Goll could be followed up to the uppermost part of the cord.

Case V.—Endothelioma of the cauda equina. Paraplegia, operation, recovery. A farmer forty-five years old was seen with Dr. Reginald H. Jackson, of Madison, Wisconsin, in April, 1916. In the spring of 1915 he developed pain along the outside of the right thigh. Three months later the right foot became numb and soon also the left foot. In January, 1916, an attack of sudden, severe backache was followed in two days by paralysis of both legs and slowness of micturition, with occasional retention requiring catheterization. X-ray examination of the spine and pelvis was negative. When examined by the writer extension of the toes and ankles was almost *nil*, and of the knees very poor. Adduction of the thighs was poor. Plantar, ankle and knee reflexes absent; cremasteric weak; abdominal normal. Impairment of sensation, especially tactile, corresponding to all sacral and the fifth lumbar segments. Lumbar puncture was attempted and no fluid obtained. The needle appeared to be lodged in solid tissue. April 25, 1916, Dr. Jackson removed a grayish-red intradural tumor 4½ inches long, which filled the dura tightly from the third to the fifth lumbar vertebræ, and bulged through the foramina. Histological diagnosis, endothelioma. The patient soon began to improve. When seen six weeks after the operation the ankle jerks remained absent but the knee jerks had returned. After a few months the patient could walk and is now reported to be practically well.

Case VI.—Intramedullary sarcoma. A man of thirty-seven years slowly developed weakness and unsteadiness of the legs, slow micturition, and a girdle sensation below the umbilicus, beginning in the summer of 1915. No pain. When examined in January, 1916, he still walked fairly well. The leg reflexes were increased; the arm reflexes normal; abdominal reflexes absent. Analgesia below the level of the sixth rib. Tactile sensation normal. The spinal fluid was yellowish, coagulated spontaneously but not massively, gave a strongly positive globulin test, and a cell count at first of 18, later 38. The patient gradually grew worse and was referred to Dr. Charles A. Elsberg, who operated on May 23, 1916. The moving pictures showing the steps in a laminectomy exhibited by Dr. Elsberg at the Detroit meeting of the American Medical Association were secured at this operation. The tumor was located, was found to be mostly within the cord, though reaching the surface, and as it did not extrude it could not be removed. A small piece secured for diagnosis showed the structure of round-celled sarcoma. The patient went home and received X-ray treatment. The condition remained unchanged for several months, but in the spring of 1917 he unexpectedly improved to a very marked extent, especially in regard to walking. This may be ascribed to partial extrusion, or to the X-ray treatment.

Slides were also shown of the X-ray and histological findings in the two cases of extradural fibroma successfully operated, previously shown by Dr. Bassoe to the Society, both patients remaining well; of a case of implantation glioma of the cord in connection with fourth ventrical tumor, and of a case of central tuberculosis of the cord with total transverse lesion.

ON THE USE OF THE TERM "HYSTERIA," WITH A PLEA FOR ITS ABOLITION AND A CONSIDERATION OF THE PROBLEM OF DISMEMBERMENT OF SO-CALLED HYSTERIA

By Meyer Solomon, M.D.

Dr. Solomon said the term "hysteria" is used very loosely. Different authors have different clinical concepts in mind when using it. It is a label for a protean symptomatology, including phenomena of more purely psychological type, of the voluntary nervous system, of the involuntary nervous system and even of ductless glands and biochemical nature.

By a brief review, with critical discussion, of the most important attempts to clinically delimit so-called hysteria, he said that it is the use of the term "hysteria" which is the stumbling block to all.

He advocated the abolition of the term "hysteria" and mentioned the errors in diagnosis of conditions erroneously labelled "hysteria."

He offered the following plan of dismemberment of so-called "hysteria," with classification of the chief clinical types, ordinary voluntary activity being included for purposes of comparison.

I. Ordinary Voluntary Activity.—Performed consciously and purposely, consists of ideational processes, emotional reactions, and activity of the voluntary but not of the involuntary nervous system. Is transient in nature.

II. Simulation.—Same as ordinary voluntary activity but motive is different. Can affect involuntary nervous system not directly but only indirectly and temporarily by antecedent assumptions of emotional states. Can not produce lasting disorders. Exaggeration is closely related to simulation.

III. Lying.—Ordinarily is the self-conscious employment of ideational processes for wilful misrepresentation.

IV. Pithiatism (Babinski).—These manifestations are the result of blind conduct, due to suggestion, not self-consciously purposive. Can affect only voluntarily controlled activities—ideas, acute and transient emotional attitudes, the voluntary sensorimotor nervous system. The involuntary nervous system cannot be influenced directly by suggestion but only indirectly and transiently by intervention of the emotions. *Suggestionism* is a better term than *Pithiatism.*

V. Mythomania (Dupré).—Self-mutilations produced secretly by the patient to deceive the physician. *Self-mutilation* is a better term than *Mythomania.*

VI. Disturbances Due to Direct Emotionalism and Shock.—Not due to simulation or suggestionism (pithiatism). Unconsciously and non-purposively produced. It is a biolological reaction in response to certain disturbing stimuli, internal or external (ideas or shock). Emotionalism may produce transient phenomena accompanying the acute emotionalism, or prolonged, post-emotional phenomena.

A. *Transient Phenomena Accompanying Acute Emotionalism.*—Four chief kinds of symptoms may result: (1) Activity in the ideational sphere. (2) Activity in the sphere of the feelings with the assumption of characteristic emotional attitudes. (3) Reaction of the voluntary sensorimotor nervous system. This includes the so-called hysterical crises. There is some voluntary control over the reflexes. (4) Reactions in the domain of the involuntary (*a*) sensorimotor and (*b*) vegetative nervous systems. The former comprise the skin and tendon reflexes. The latter are of two kinds: (1) internal phenomena with reactions of the visceral functions—heart, intestinal muscles and glands, etc.; and (2) peripheral vegetative nervous system functional reactions—sweat, vasomotor phenomena, etc.

B. *Prolonged Post-emotional Phenomena.*—Here, too, the reaction may be in one or more of the same four spheres: (1) Ideational processes. (2) The feelings with their specific attitudes. (3) Disturbances of the voluntary sensorimotor nervous system. This group of reactions comprises the most characteristic and typical set of disorders which all have been classifying under so-called "hysteria," seen most typically in the post-traumatic form of so-called "hysteria." If the term hysteria were to be used at all, Dr. Solomon would advocate limiting its employment to this particular class of symptoms. The term *neuromimesis,* which Sir James Paget once suggested be substituted for hysteria, can well be applied to this special group, giving it the limited clinical significance here outlined It would thus be employed to designate fixed, prolonged, post-emotional disorders of the voluntary sensorimotor nervous system. These phenomena are emotogenetic in nature, not due to simulation or suggestion, and are involuntarily produced. (4) Disorders of the involuntary (*a*) sensorimotor and (*b*) vegetative nervous systems. Here, too, the involuntary sensorimotor reactions consist of the skin and tendon reflexes, while in the involuntary vegetative nervous system we have two groups: (1) internal or visceral, and (2) peripheral disorders of a prolonged nature. One must exclude all possible causes other than emotional shock and trauma before attributing this class of disorders to emotogenetic factors. Nor is it easy to prove such etiology or genesis. Ductless gland and biochemical changes included.

The transient disorders accompanying acute emotionalism are normal and occur in all of us in varying degree. Those who develop the post-emotional disorders of a protracted, fixed nature, have exceedingly impressionable, sensitive, irritable, abnormal nervous constitutions.

Dr. Solomon believes that if he is justified in offering the above tentative classification, it means that in all cases one must make a careful investigation of the possible mental state of the person presenting the symptoms and as to the genetic factor or factors responsible for the evocation of the particular picture before one for diagnosis.

There may be a combination of two or more of these types of reaction in the same person. For example, an individual may have what may be conveniently called neuro-mimetic symptoms, and still resort to lying or simulation or self-mutilation or all three as superadded types of reaction.

Dr. Harold N. Moyer said the paper was of especial interest to one dealing with personal inquiry cases. Reports in such cases must be intelligible to the average layman. A diagnosis of hysteria under these circumstances is worthless, each symptom must be described and its character and relations analyzed.

Dr. Peter Bassoe said that the cases which had been related strengthened his conviction that the only theory of hysteria which can be made sufficiently clear for teaching purposes is that of Babinski. The primary symptoms are the direct result of the patient's suggestibility. Secondary symptoms of a physical nature, such as muscular atrophy or edema, are the result of the primary symptoms. For instance, in hysterical paralysis of the arm, the hand may become swollen and the arm muscles show atrophy of disuse, but these symptoms are not directly psychogenic.

Dr. Harold N. Moyer, replying to Dr. Bassoe, said he recognized that distinction perfectly and it enabled him to distinguish between an ordinary case and the malingerer in many instances, but the Babinski formula is not broad enough. In the same hysteric phenomena can be found that give the exact formula of Babinski and also other symptoms varying in grade that do not correspond to his formula at all. It is not broad enough for the whole group of cases but for teaching it has its values.

CHICAGO NEUROLOGICAL SOCIETY

May 17, 1917

The President, Dr. Harold N. Moyer, in the Chair

CYST OF THE CEREBELLUM

By Hugh T. Patrick, M.D.

Dr. Patrick exhibited a brain which presented three points of interest. The specimen was from a child of eleven years whom he first saw three years ago. One point of interest was that at ten months she had had pertussis and a right hemiplegia from which she never fully recovered. The cerebral hemispheres had not yet been examined. The later trouble began three and a half years ago with severe headaches which became more frequent and severe and were associated with vomiting. The mother had been subject to migraine all her life and in the beginning the child apparently had a migraine. She was seen by Dr. Gratiot of Dubuque who found a double choked disc and small hemorrhages in the retina. That was all he could make out at that time. She was put on iodid and improved; the swelling of the discs entirely disappeared but left a considerable optic atrophy. All other symptoms subsided and the child was apparently perfectly well, a casual examination at this time showing nothing but the remaining optic atrophy and the old hemiparesis, and Dr. Patrick thought probably the trouble was a serous meningitis. No signs of syphilis were seen and no Wassermann or spinal puncture was performed. She continued to be quite well except for occasional slight headache until December, 1916, when she commenced to have severe headaches about once a week. They gradually increased in severity and in January she began to vomit. Lumbar puncture (Dr. Gratiot) showed normal fluid and Wassermann on both blood and fluid was negative. In February, 1917, she was taken to the Mayos where tonsils and adenoids were removed. Three weeks later there were still signs of increased intracranial pressure and the discs were slightly blurred. She received no treatment but rapidly improved, so that in a short time she was comfortable and able to be up in a wheel chair, when suddenly she went into collapse, the pulse became barely perceptible and death looked imminent. She remained in collapse for twenty-four hours and then rallied. Following that the pulse was sometimes slow and sometimes as high as 140.

Dr. Patrick saw her on April 4 but could make no localization. There was no history of reeling and the child was too weak to stand or even sit. There was no nystagmus and no deafness. Sensation seemed to be normal and there was no paralysis except a right facial palsy of the peripheral or nuclear type, though the lower face was more affected than the upper. The deep reflexes were very feeble, the superficial about normal. Mentally she was normal and speech was not affected. She quietly died on April 6.

Autopsy showed an enormous cyst, probably gliomatous, occupying practically the entire left cerebellar hemisphere. Dr. Patrick said that had an operation been done he would certainly have advised that it be done on the right side, for the only localizing sign present was the right facial palsy. He believed that probably the breaking down of the tumor and formation of the cyst had relieved the pressure and accounted for the earlier remission of symptoms. How the growth on the left side caused a right-sided facial palsy

was of interest, but he thought this might be explained by the fact that in the pons the cyst certainly crossed the middle line. Thus it might create pressure on the right facial nerve or possibly the growth might have penetrated as far as the right facial nucleus.

Dr. Peter Bassoe said he had seen similar downward bulging of the infundibulum, caused by hydrops of the third ventricle in cases of tumor of the fourth ventricle, with secondary hydrocephalus.

Dr. Patrick said that had he advised operation he would have advised it on the right side. Dr. Bassoe has become convinced that no matter on which side a cerebellar tumor is localized a bilateral operation should always be done, the bone being taken out equally on both sides from the curved line down to the foramen magnum. Hence it is as well merely to advise exposure of the cerebellum and not to specify the side as the surgeon may be tempted not to remove enough bone.

Dr. George W. Hall had understood Dr. Patrick to say that the child had a collapse some time before her death, and he inquired as to the probable cause. He had had two cases of gliomatous growths in the brain proper during the year in which there was paralysis on one side, and autopsy showed hemorrhages around the growths.

Dr. Ralph C. Hamill said he had recently had a case of cerebellar cyst in which the patient died on the operating table. There were abundant symptoms of a left-sided cerebellar involvement with a slight facial paresis in both the upper and lower divisions of the facial group, with increased reflexes in the right arm and leg and very marked cerebellar ataxia in the left arm and leg. Autopsy showed a cerebellar cyst very similar to this in size in the left hemisphere.

Dr. Lewis J. Pollock called attention to the interesting fact that in cases of pineal gland tumor collected by Jelliffe, 60 per cent. showed a chronic hydrocephalus with a cystic third ventricle.

Dr. Patrick, closing, said that he entirely agreed with Dr. Bassoe,—he should have said that he would have advised opening the right side first. If the cyst had been opened it might have saved the patient's life. Presumably most of the collapse was caused by change in pressure. That is true in most cases and it was not surprising that it should occur in this case. He did not consider the case unique, but simply another example of the difficulty of localization of cerebellar growths, and the enormous lesion that could be present without producing any cerebellar ataxia.

Dr. Herman M. Adler read a paper entitled "The Psychiatric Needs of Chicago, with Special Reference to the War."

Dr. Lewis J. Pollock read a paper entitled "The Histopathology of a Case of Progressive Lenticular Degeneration," illustrated with lantern slides.

AMERICAN NEUROLOGICAL ASSOCIATION

Forty-third Annual Meeting, May 21, 22 and 23, 1917, held in Boston, Mass.

The President, Dr. E. W. Taylor, in the Chair

(*Continued from page 281*)

THE EXPERT AND THE ISSUE. 1. THE INSANITY PLEA IN A CRIMINAL CHARGE. 2. THE QUESTION OF TESTAMENTARY CAPACITY

By Sanger Brown, M.D.

Anticipation of discomfiture on the witness stand. Distinction between the services demanded of the expert and the duties of the clinician. The real issue and the strategic devices of counsel to shift or obscure this. Illustrative cases. "Mental norm" suggested as a convenient term by which to designate an individual's emotional, moral and intellectual reaction.

Dr. J. W. Putnam said the first part of the paper stated that very frequently the expert would leave the witness stand with a sense of discomfiture at not having been able to present his views fairly before the jury. The speaker did not consider that at all necessary; for the simple reason that we have a weapon in our hand which we can always use, which the speaker had used once, when the judge had told him that it was perfectly satisfactory. The witness states, before he utters a word, that he will swear to tell the truth, the whole truth and nothing but the truth. On this particular occasion when Dr. Putnam was about to leave the witness stand he turned to the court and said that he had sworn to tell the truth, the whole truth and nothing but the truth, but had not yet had the opportunity. The judge said: "You may state anything you wish to make you tell the whole truth"; and Dr. Putnam had then made the statement, or enlarged upon it, and did not feel any discomfiture.

TREATMENT OF DELIRIUM TREMENS BY STIMULATION AND SPINAL PUNCTURE

By Herman H. Hoppe, M.D.

Etiology, edema of the brain. The Fisher theory of acidosis and edema. Hogan's treatment. Résumé of two years' treatment. Cincinnati General Hospital. Comparison with previous results.

Dr. Gordon, of Philadelphia, said a couple of years ago he had happened to have a number of cases in a consultatory capacity presenting severe headache following or during the course of infectious diseases: pneumonia, typhoid fever, and scarlet fever. All the ordinary means had been exhausted by the attending physicians. The headache persisted, and was of unusual severity. He at once suggested lumbar puncture. It was remarkable that uniformly, in all of those cases (numbering about eighteen within a period of four or five weeks), there was relief from the severe headache. Lumbar puncture was repeated several times: in some of the cases four times, in some only twice. In one case it was done eight times. Small quantities were

removed, from 5 c.c. down to 3 c.c.; and the relief of the headache was simply extraordinary. Some of the patients had, in addition to their headache, a delirious state, confusion, with delirium and hallucinations, but non-alcoholic; and the delirium subsided and disappeared subsequently to the punctures. Since then he had, in addition to the ordinary treatment, systematically treated all alcoholic cases with lumbar puncture.

In every case of delirium tremens he had removed, for instance, 10 c.c. of spinal fluid and injected 5 c.c. of a plain saline solution. He did not know whether this latter method had had any special beneficial effect; but placing these opposite the cases he had referred to before, he felt that the removal of the spinal fluid by which the diminution of the intracranial pressure was produced, alone had a great deal to do with the improvement in the patients. If properly carried out this method does not do any harm.

The delirious case did not present headache, which is frequently observed after lumbar puncture. He was entirely in accord and could corroborate the statement of Dr. Hoppe with regard to the improvement in the cases of delirium in general.

As a case apart, in some respects, one man with chronic lead intoxication presented a very severe headache, and one night had delirium, when immediately lumbar puncture was done and 25 c.c. removed; the patient was very much better next night; five days later 10 c.c. were removed and the headache disappeared, as did also the delirium. This patient did not present an alcoholic history.

Dr. Knapp said he would agree in the main with what Dr. Hoppe had said about the treatment of alcoholics; but regretted to say that in this community the custom of physical restraint, heavy drugging, not only with bromide and chloral, but paraldehyde and morphin, and other things, still obtained; and, what is worse, they cherish the deadly delusion, which the surgeons are still promulgating, that the man who is habituated to alcohol must have more alcohol given him in order to keep him from having delirium tremens. Even in spite of everything he had had to say, he regretted to say that a good many surgeons in Boston followed that practice still; and he had had occasion, within the last two or three weeks, to express his opinion of the carelessness of such surgeons. The salines, the treatment by digitalis, he would heartily commend. Long ago he had had called to his attention, and had found it useful in certain cases, the use of massive doses of digitalis, 40 minims to a drachm of the tincture, which sometimes had remarkably good effects in delirium tremens.

With regard to the lumbar puncture, he had tried it more or less for four or five years. It might be that the cases in which he had tried it had been cases of chronic alcoholism with an exacerbation of acute delirium tremens; certainly as a rule most cases of delirium tremens are seen in men who have been in the habit of drinking a good deal, and pretty steadily, before they have the delirium; but not only in cases of acute delirium, possibly on a chronic basis, but in cases of wet brain in general of the alcoholics, he had not seen any definite benefit from lumbar puncture. He had tried it in a good many cases, both in the early stages and in the advanced stages of the chronic wet brains; and he had not been able to convince himself that it is, as a rule, of very much avail; in fact, in the last year, he had resorted to it comparatively little.

Dr. Southard wanted to rectify statements of Dr. Knapp at least to the extent of saying that no such dark-age methods of treating delirium tremens prevailed at the Psychopathic Hospital. Dr. Southard called attention to Dr. Donald Gregg's finding that poor methods (over-drugging and restraint) without the benefits of modern hydrotherapy prevailed in many of the so-called best hospitals of the country. He believes that Dr. Gregg had found

a mortality of something like 26 per cent. in combining figures from five of these so-called "best" hospitals. The percentage of mortality could be made extremely low, largely by not doing what many of the hospitals are doing, by omitting restraint and drugging and by using hydrotherapy. The Psychopathic Hospital percentage was low. The statistical criteria might differ, but at the most, even including sundry moribund and surgical cases, the percentage could not be placed above 7 per cent. and would probably run much lower. Securing such good results, the Psychopathic Hospital officers had not used the special methods discussed by Dr. Hoppe.

As for lumbar puncture in delirium tremens, Dr. Brickley, of the Relief Station of the Boston City Hospital, at one time made a number of therapeutic lumbar punctures, but according to a personal communication, Dr. Brickley had found the good results of therapeutic lumbar puncture to be only temporary.

Dr. Hoppe, in closing, said that although he had laid a great deal of stress on spinal puncture in the treatment of delirium tremens, that it was only a part of the treatment and in the beginning was used only in severe cases. Its object was to relieve pressure on the cortex of the brain by the removal of the excess cerebrospinal fluid. Without the removal of this pressure, the measures employed for alkalinization of the blood and the stimulation of the circulatory apparatus would be less effective.

Since January 1, 1917, they have done spinal puncture as a routine measure on every patient, even incipient and mild cases of delirium tremens, admitted to the psychopathic department of the Cincinnati General Hospital. The results have been a great deal better, more cases being aborted and others running a milder course. The combination of alkalinization, stimulation and spinal puncture will restore the function of the cortical cells and remove the acidosis, which is perhaps the main factor in the production of the delirium. It is interesting to refer in this respect to a recent article in the Journal of the American Medical Association on the treatment of severe cases of lobar pneumonia complicated with acute delirium by lumbar puncture. Uniformly good results were obtained by the procedure.

An examination of the table included in the paper will show that where death occurred it was usually due to chronic Bright's disease, and most frequently to interstitial nephritis.

Dr. Hugh T. Patrick read a paper on Arthritis of the Hip-joint.

Dr. W. M. Leszynsky, of New York, said that Dr. Patrick had probably forgotten having called attention five or six years ago to this method of excluding hip-joint disease. Since taking up the practice of perineural infiltration in the treatment of sciatica, he had followed this plan as a routine measure in several hundred cases during the last five years, and had found it a simple and extremely valuable procedure. He could not agree with Dr. Patrick as to the presence of arthritis in 90 per cent. of the patients with sciatic pain. In his experience, many of these patients had been promptly relieved after a single injection, and others after several injections, having previously suffered for six, eight or ten weeks or longer. Had an arthritis of the hip been present, the sciatic pain would not have disappeared and the patient restored to activity within a few days. In some patients with sciatica he had found slight rigidity of the hip-joint which had lasted several days. It was not an uncommon error for hip-joint disease to be mistaken for sciatica. This was usually due to carelessness or incomplete examination.

Dr. Ramsay Hunt remarked that the procedure described by Dr. Patrick, necessitating flexion and abduction of the thigh, might also throw some strain on the sacro-iliac joint. He inquired if sacro-iliac disease could be definitely excluded in this group of cases.

Dr. McConnell asked whether, in the studies that Dr. Patrick had made, he had found the symptom present in the atrophic, as well as the hypertrophic, type of arthritis.

THE CLINICAL DISPLAY OF SYPHILIS OF THE NERVOUS SYSTEM

By Joseph Collins, M.D.

It has long been taught and accepted that syphilis, when it affects the nervous system, displays itself in a rather typical way to cause definite diseases. The careful study of the blood serum and the cerebrospinal fluid of patients who have come to the Neurological Institute during the past eight years for the relief of infirmities which are not suggestive of definite disease, shows that many diseases of the nervous system due to syphilis do not display themselves in the guise of diseases generally considered syphilitic, such as tabes, general paresis, syphilitic myelitis, cervical pachymeningitis, basilar meningitis, etc. In reality, syphilis of the nervous system displays itself frequently by symptoms and syndromes that have not been considered to be even suggestive of syphilis. The display of symptoms of all the patients with syphilis of the nervous system who have been examined during the past eight years will be depicted, and an attempt made to classify them, i. e., to inquire if they conform often to the display of other than generally accepted syphilitic disease. An attempt is made to defend the position that from the therapeutic standpoint it is not material to make the diagnosis of what part of the nervous system displays the syphilitic lesion, but that it is all important to determine this in order to be in a position to estimate the prognosis; finally the information obtained from the history and examination of the patient will be contrasted with the information obtained from the laboratory, and the reliance to be placed on the two will be contrasted.

THE RATIONAL USE OF LUMBAR PUNCTURE AND INTERPRETATION OF FINDINGS

By James B. Ayer, M.D.

Puncture unnecessary or contraindicated in some cases where it is done now. Not employed in some cases in which much information might be obtained. Interpretation of findings with correlation of all tests, together with the clinical picture, makes possible finer diagnoses, more accurate prognoses and efficient treatment. A plea for the rational employment of lumbar puncture and for the fullest possible interpretation of its findings. Observations based on personal examinations during the past ten years.

THE RESULTS OF SALVARSAN THERAPY IN SYPHILOGENOUS DISEASES OF THE NERVOUS SYSTEM

By Joseph Collins, M.D., and Walter Haupt, M.D.

The results obtained by salvarsan therapy in the clinic of the Neurological Institute during the past three years will be presented, after a brief discussion of the experience with salvarsan in this Institute during the first three years of its existence.

(*a*) The methods of administration and general plan of treatment.

(*b*) The results of salvarsan therapy in cases of tabes, cerebrospinal syphilis and general paresis, and the effect on the various cardinal symptoms of these diseases.

(*c*) The influences of salvarsan therapy on the serology of these diseases (with charts).

(*d*) Discussion of cases of especial interest.

HEREDITARY SYPHILIS AND THE NERVOUS SYSTEM

By C. D. Camp, M.D.

As shown by the paper of Dr. Collins, the number of cases of disease of the nervous system due to syphilis is increasing greatly. This will be more fully appreciated if one looks over the reports of large hospitals in various parts of the country. Five or ten years ago the diagnosis rarely appeared, now hundreds of cases are reported. Dr. Camp first noticed this increase in his own clinic, but he finds that there is about the same proportionate increase in other clinics. This increase is open to several explanations: There may be an actual increase in the incidence of syphilitic infection and simply a corresponding increase in cerebrospinal syphilis. He does not believe this is the correct explanation for, while he has no comprehensive statistics, those that he has would not bear it out. Another explanation is that there is a change in the strain of the spirochete that is now most infectious. Although there is some evidence to prove the existence of a special neurotrophic strain of spirochete, no morphologic or cultural peculiarities distinguish it from the others. A third explanation for the increase of cerebrospinal syphilis is the influence of factors that lower the resistance of the nervous system. Krafft-Ebing, Monkmöller and others have recognized the fact that paresis is a disease of civilization, and it would seem that a modified fatigue theory, as applied to tabes, also applies to paresis and other forms of cerebrospinal syphilis. It has been demonstrated frequently (Frühwald and Zalozweicki and others) that spirochetes are present in the cerebrospinal fluid in the secondary stage of syphilis, but give rise to no symptoms. Probably in these cases no symptoms will arise until, or unless, some trauma or other factor lowers the resistance of the nervous system. The resulting type of cerebrospinal syphilis depends more on this factor than on any peculiarity of the spirochete. Dr. Camp believes that the use of salvarsan or its substitutes lowers the resistance of the nervous system, owing to the well known neurotrophic effect of arsenic, and is one of the factors responsible for the increase of syphilitic affections of the nervous system.

There is not time, nor would he care to go extensively into the subject of hereditary syphilis, but he wished to propose certain questions which he hoped would be discussed by the Association. The first one is the question of the diagnostic significance of the Wassermann reaction in hereditary syphilis. The Wassermann reaction from the blood is frequently negative in children born of syphilitic parents; it will remain negative, as Grüle has shown, until the development of syphilitic manifestations. Dr. Camp feels little doubt but that those children are liable to the development of central nervous system syphilis and, as in the case of acquired syphilis, the Wassermann reaction remains negative on the blood. Another point which is usually relied upon for diagnosis is the presence of syphilitic stigmata, significant lesions of the bones and teeth particularly. It seems to him that these should not be overrated in diagnosis. It has been shown that in many cases of chil-

dren born of syphilitic parents, where the child actually has developed a juvenile paresis or a juvenile nervous system syphilis, the stigmata are absent; and when we stop to consider that in cases of acquired syphilis affecting the nervous system, the manifestations relating to the mesodermic tissues have been noted to be relatively slight, he thinks we can understand why, in cases of inherited syphilis of the nervous system, these other mesodermic syphilitic stigmata may be expected to be absent.

An important point which Dr. Camp has noted in a few instances is the negative Wassermann reaction in the blood, and in the spinal fluid, in the parents, with positive findings in the child of those parents. He mentioned this in a paper read before this Association two or three years ago, and he has extended his experience in this respect. The most striking case, perhaps, was one in which he was asked to see a child in which the diagnosis of tuberculous meningitis had been made. He suspected a syphilitic meningitis from the symptoms. The lumbar puncture was done upon the child but it was in the country, and he had no opportunity of examining the spinal fluid immediately. The father, on close questioning, admitted having been infected with syphilis at the age of nineteen; he was then a man of forty. Dr. Camp advised antisyphilitic treatment for the child and he recovered though he later developed epilepsy. The spinal fluid showed a positive Wassermann reaction and no tubercle bacilli. The father afterwards came to the University Hospital and was examined thoroughly. He had no symptoms and the Wassermann reaction on both his blood and spinal fluid was negative. These cases seem to Dr. Camp to indicate the necessity of not being led astray by the negative findings in the parents.

Finally, he called attention to a condition which has been described as "degenerative hysteria," in which the child or young person is obviously or apparently hysterical or exhibits phobias or impulsions and with tendencies to antisocial characteristics, stealing, etc. Quite frequently, in such cases one finds an unquestionable syphilitic taint. In some of these cases the syphilitic taint has been recognized because a parent is paretic, or has some other syphilitic condition. In other cases the syphilis has been recognized solely by the biological reactions. Dr. Camp believes that in these cases we do not deal entirely with a psychoneurosis, but only partly with a psychoneurosis; that the real underlying change is a degenerative change in the nervous system which is the result of an inherited syphilis.

Dr. Henry A. Cotton read a paper on Intracranial Treatment of Paresis.

The papers by Drs. Collins, Ayer, Collins and Haupt, Camp, and Cotton were discussed together.

Dr. Patrick desired to inquire whether the various diseases listed in the tables were supposed to be examples of syphilitic disease or instances of these disorders occurring in syphilitics. If the former, he would have to disagree with Dr. Collins. For instance he noted seven cases of trigeminal neuralgia. In several hundred cases of this disorder Dr. Patrick had never seen one which could be said to have been caused by syphilis. He believed that such a thing as syphilitic tic douloureux did not exist. That trigeminal pain, pain in the distribution of the fifth nerve, could be caused by syphilis of course every one recognized, but this does not constitute trigeminal neuralgia. He also believed that migraine is not caused by syphilis. It goes without saying that severe paroxysmal headache is frequently the result of syphilis, but that does not constitute migraine. That true migraine occurs in syphilitics, as does also trigeminal neuralgia, is perfectly true, but that is no proof that syphilis is the cause of the disease. He thought that we must be very careful indeed not to conclude that some symptom or group of symptoms in a syphilitic patient must necessarily be due to syphilis.

With regard to lumbar puncture being unnecessary, when the diagnosis

of syphilis is certain, the speaker could not agree with this sentiment. In such a case examination of the fluid is useful not only as an indication of the activity of the pathological process but as a guide to the degree of improvement and to further treatment.

Dr. Solomon spoke of the work done under the Massachusetts Commission on Mental Diseases. The special officers had examined some five to six hundred cases of brain syphilis, observing treatment in a number of hospitals. Treatment had now been in progress for about four years, having started in the Psychopathic Hospital and then spread to other state institutions.

Dr. Solomon spoke of the fact that embracing the opportunity offered by ventricular punctures, we had discovered that the subdural fluid and the ventricular fluid often gave entirely different pathological and chemical tests, although the fluid was withdrawn at the same operation. Both gold sol tests and Wassermann tests had been found to differ.

Another point was that the findings in the different tests did not change synchronously. One case under treatment had become entirely negative as to ventricular fluid and remained negative for six months, during which period, however, the spinal fluid remained positive. One case, apparently of the paretic type, had now been under observation four years whose tests were completely negative.

The intravenous injections of salvarsan have been given frequently in the Massachusetts series, sometimes 40–50 or even 100 injections in a period of a few months. Injections are given at least twice a week in conjunction with mercury and iodides. Sometimes the colloidal gold tests become negative, whereas all other tests remain positive. In other instances, all the other tests become practically negative and the gold test remains positive.

The Massachusetts workers had not claimed *cures*,—they had claimed "improvements," and had gotten improvements by every method used. In a preliminary survey of 300 untreated cases but five left the hospital able to work. In the treated cases in the Massachusetts series, about 25 per cent. had left the hospital self-supporting. The work had seemed to render 40–50 persons self-supporting. Dr. Solomon said he was personally convinced that paresis was amenable to treatment, at all events, to the extent of restoration of ability to work for a period. If one can put a paretic back to work for a period of not less than a year, certainly that is something of an achievement.

Dr. Bailey said he failed to agree fully with some of the findings of Dr. Collins's tables, particularly in regard to the epilepsy. He did not see that the proof was convincing as to the important rôle that syphilis plays in epilepsy; his experience in regard to epilepsy had been rather different from Dr. Collins's in that syphilis was rarely demonstrable. He thought, in regard to paresis, that possibly it was just the wording of the statement that he did not agree with. He (Dr. Collins) said that the treatment has no effect upon paresis, which had not been the speaker's experience: on the contrary, it has had a decided effect, not only on the symptoms of paresis, but also on the working capacity of the individual. In the cases that he was familiar with, during the course of the disease the man had had better working capacity, and throughout a better conception of his own condition.

Since the discovery of Wassermann conditions that had passed as non-syphilitic had come to be shown definitely the contrary. They had recently had in the hospital a case whose course was absolutely typical of an acute spinal cord tumor of ascending type; the whole hospital staff was satisfied that it was a spinal cord tumor and nothing else; the condition was very acute; the man went to the table before the Wassermann in the spinal fluid was completed; but just before he was operated on, word came in that he had a positive Wassermann in his cerebrospinal fluid and a considerable number of cells (over twenty, as he recalled), so the operation was fortunately

discontinued and the man went back to the wards with his paraplegia. Under salvarsan that man made an absolutely complete recovery, and walked out of the hospital inside of three weeks. In old days he would have been regarded as a case of spinal cord tumor without findings.

The other point he wished to speak of, at the other end of the line from the recognized organic cases, was the effect of the existence of syphilis, as shown only by the Wassermann, in the matter of behavior. He felt this to be growing more and more important. It may very well be that syphilis itself does not cause psychasthenia and other neuroses; but there is a certain poison retained in the body which may influence behavior. This has been brought up in one of the reports of the surgeon-general of the navy. In the Bedford Reformatory is a class of girls who are supposed to be about the worst class collected in any institution. They have peculiar forms of behavior there. One, particularly, being the smashing of windows; and of these girls, 50 per cent. are syphilitic, and have positive Wassermanns when they are admitted. Up to now none has been systematically treated. It seemed entirely possible to believe, with the high percentage of syphilitic inmates who are so disorderly, that syphilis itself has a good deal to do with the general discipline and behavior of the institution. This was a point that Dr. Collins had touched but lightly upon; but the systematic treatment of syphilis, even in psychological cases, might be of very great significance.

Dr. Leszynsky said that since the popularization of lumbar puncture, it had become a routine measure, and the breaking off of the needle in the spinal column occasionally happened. This was commonly due to a defect in the ordinary steel needle. He had therefore had a special needle constructed, so that such an accident would be practically impossible. It is known as a "nickeloid malleable spinal puncture needle." It is unbreakable, non-corrodible, and no more expensive than the ordinary lumbar puncture needle, and is a radical improvement on the usual type of needle used for this purpose. The general use of a platinum needle is at present prohibitive on account of its high price. A description of the needle will appear in the New York Medical Journal in the course of a few weeks.

Dr. Ayer said he did not want to leave an impression that he did not believe in lumbar puncture. As a matter of fact, he believed that it was done too little rather than too much, but he did wish to emphasize the danger of puncture in some cases of increased intracranial pressure, and he felt that a choked disc was the best guide in this case. He said he had punctured patients with choked discs, but with great caution; but that his statistics were mostly drawn from medical services where they seemed to regard it as safer than he did. He could not agree with the gentlemen who said that because we have positive blood puncture is unnecessary. The prognosis is apt to be very different in cases with positive blood and negative fluid, compared to those with both blood and fluid positive. In fact, it may even be said that it is a different disease entity; the symptoms, however, may be identical. It is important to have the examination of the spinal fluid in cases where intensive treatment is being given because it is most important to follow not only a patient's symptoms and signs, but also his spinal fluid and blood reactions under treatment.

Dr. Camp had surprised him a little in saying that he had seen more cases recently of acute cerebral meningitic forms than he had previously. The speaker's experience had been just the contrary. In 1912–1913 he had seen a number of cases of neuro-relapse following salvarsan therapy. He has not seen any such cases of late, though of course it is possible that they may have gone to the internist.

Dr. Collins, closing, said Dr. Patrick was apparently not in the room when the former presented his first paper. Had he been, he would have

realized that Dr. Collins had made statements that would meet Dr. Patrick's requirements for acceptance. He had discussed at some length whether or not one could say that syphilis, with which the individual was previously infected, caused the trigeminal neuralgia, the poliomyelitis, the epilepsy, etc., or whether these diseases are of their usual origin, occurring in a syphilitic individual. When individuals displaying symptoms of these diseases had the laboratory reactions of the syphilis either in the blood or the spinal fluid, or both, and particularly when the symptoms disappeared rapidly under antisyphilitic treatment, or were profoundly ameliorated, then they were considered syphilitic. Some of the cases of trigeminal neuralgia had been subjected to alcoholic injections. In one of these cases which he had already published, a case of true trigeminal neuritis with paroxysms of intense pain, it was astonishing how quickly the symptoms yielded to antisyphilitic treatment.

The relation of syphilis to idiopathic epilepsy is one that calls for particular discussion.

Unless it be borne in mind that with the crude antigens the blood serum gives almost invariably the positive result, one is apt to be deceived concerning the relationship of syphilis to epilepsy. When cholesterinized antigens are used then the reaction of the serum is weakly positive or negative. Dr. Collins never makes a diagnosis of syphilitic epilepsy without the opportunity of examination of the cerebrospinal fluid. The extraordinary reactions of the serum taken from patients with idiopathic epilepsy when crude antigens are used is one of the problems that is still unsolved.

When the speaker first began to treat cases of syphilitic paresis with salvarsan, he was inclined to believe that the course of the disease was influenced most remarkably by such treatment. At the present time his conviction is that the course and character of the disease was influenced, perhaps remarkably, but not influenced to such a degree that it kept the disease from overtaking the patient usually after six to eight years. He would say, therefore, that salvarsan treatment of general paresis ameliorates the symptoms of the disease and prolongs the patient's life, but up to date he had not encountered a single instance in which the disease had been arrested. It seemed conclusive to him that once the spirochetes took up their abode permanently in the circumvascular spaces they were not killable by any means now at our disposal. A quietus could be put upon their activity and this could be made to continue for quite a long time, but they eventually get the upper hand.

He did not find himself in full accord with those who minimize the value of frequent lumbar puncture. His own conduct was that if a patient did not submit to lumbar puncture as frequently as he thought necessary he did not go on with treatment. He regarded lumbar puncture as yielding information upon which the prognosis is based unequalled by any other information. There is no way of telling a patient how his treatment is going on except by performing lumbar puncture. He would no more attempt to treat a patient with syphilis of the nervous system without an original lumbar puncture than he would without physical examination; and he had had no experience with lumbar puncture that taught him to do otherwise.

He had not the same dread of doing lumbar puncture in cases of choked disc that Dr. Ayer had, because he had never seen any injurious results follow it. He was in full accord with what Dr. Ayer had said regarding the necessity for doing the lumbar puncture carefully and estimating the pressure under which the fluid existed, removing it slowly and never in such amounts as were necessary for the interpretation of the patient's condition. What causes lumbar puncture headaches is still a riddle in need of solution. It is an extraordinary thing that it seems to occur in hospitals in waves as it were. For weeks at the Neurological Institute no one would have serious lumbar puncture headaches and then weeks would occur in which nearly

everyone would have puncture headache except those who had extensive syphilitic disease and especially parenchymatous syphilitic lesions, as these rarely develop lumbar puncture headache.

Dr. La Salle Archambault read a paper on The Symptomatology of Certain Infectious Processes Involving the Ciliary Ganglion or Its Connections. (Published in the September, 1917, number of this JOURNAL.)

Dr. Jelliffe asked Dr. Archambault if, in addition to the vegetative symptoms which he had described, he had also observed modifications within the eyeballs themselves, which chiefly were due to exudative phenomena of the blood vessels within the vitreous. These vitreous changes were often called arteriosclerotic by ophthalmologists, who for the most part have been unobservant of vegetative nervous system pathology. In certain vagotonic individuals severe emotional reactions would bring on these changes. He had observed them in anxiety hysterias, in manic depressive attacks, in hyperthyroid states which latter were fundamentally affective in their causation. Was Dr. Archambault in a position on the basis of his observations to outline the symptoms which would result from over-active autonomic or sympathetic stimuli as affecting the vegetative mechanisms in the eye? Dr. Jelliffe had made certain observations in which analogous changes occurred in other vegetative reflex arcs homologous with those of the eye arcs. Some of the hypertensive albuminurias, certain glycosurias, certain lumbagos, certain myasthenias, etc., are related phenomena. Dr. Archambault had accentuated the toxic factors in the eye pathology. Was it not possible in view of the studies in vagotonia and related so-called constitutional anomalies to say that the anomaly was not so much constitutional as genetically different, the affective state being the causing factor in the so-called vagotonic constitution. Deep-lying, constantly acting affective states, chiefly unconscious, contribute their quota to somatic ocular pathology.

Dr. Archambault, closing, said, in regard to Dr. Jelliffe's question, he admitted that he was not quite as excellent a pupil of Eppinger and Hess and of Higier as Dr. Jelliffe, although very familiar with their work. He had admired very much, indeed, some of the facts that had been brought out by the exponents of the vagotonic constitution and its temperamental peculiarities. If he understood Dr. Jelliffe correctly, the latter felt that possibly some of the changes the speaker had discovered might be purely transitory manifestations due to the vagotonic predisposition.

Dr. Archambault said the one objection was that his patients were repeatedly submitted to very careful examinations and, had they belonged to the vagotonic type, it seemed to him he would have been able to detect, upon close questioning and upon repeated neurological examination, some evidences of vagotonia in other functional spheres, and they certainly were not present in these cases. All said cases, he repeated, had a very acute onset following definite evidence either of systemic or of local infection. They were all followed up, not week after week, but at least several times within a period of three or four months, most of them were seen ten or twelve times, so that there could be no doubt about the findings and he did not see how they were explicable otherwise than on the basis he had assumed.

Another question concerning opacities in the vitreous was important. In the two cases reported in his paper, in which retinal hemorrhages had taken place, only one presented opacities in the vitreous, and it had occurred to him that possibly that case was not a legitimate one to incorporate in this category because, if we have lesions in the vitreous, it is only logical to suppose that there is some interference with the function of the lens. That was the only case, however, in which that doubt could be raised, and, on the whole, he did not believe there could be any question at all about the anatomo-

physiologic basis of the symptomatology he had observed in these various cases.

THE RELATION OF FOCAL INFECTIONS TO NERVOUS CONDITIONS

By Henry A. Cotton, M.D., E. P. Corson White, M.D., and George W. Stevenson, M.D.

Location of focal infections. Relations of infections to the glands of internal secretion. Complement-fixation tests and agglutination tests. Value of each. Organisms concerned in focal infections. The therapeutic value of elimination of foci of infection and vaccine treatment.

AN EXPERIMENTAL STUDY OF THE FACTORS IN THE PRODUCTION OF ASCENDING NERVE PROCESSES

By L. B. Alford, M.D., and Sidney I. Schwab, M.D.

Consideration of the term "ascending neuritis." A brief review of the theories of ascending neuritis, with a special consideration of the experimental and clinical work of Orr and Rows. The lymph flow in nerves and the principle of ascending lymph stream. The clinical importance of the question. The method used in the present study is the injection of various substances—solutions of iron salts, fuchsin, India ink, turpentine, and bouillon cultures of several species of bacteria—into the trunk of the sciatic nerve of rabbits and cats. Description of results and an explanation of ascending neuritis based upon the experiments cited. Criticism of the results obtained by other workers. Conclusions arrived at as a result of the experiments upon which this paper is based.

(*To be continued*)

Periscope

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ABSTRACTED BY DR. E. W. TAYLOR, BOSTON

XIII. The Influence of the War, Particularly of its Outbreak, on the Insane. E. MEYER.
XIV. Crowd Suggestion. H. STELZNER.
XV. Pseudohypertrophic Paralysis. G. SALA.
XVI. Experimental Production of Hallucinations of Hearing through Peripheral Stimulation. P. SOKOLOW.
XVII. Sarcoma of the Left Motor Region. M. R. CASTEX and P. O. BOLO.
XVIII. Course of Sensory, Acoustic, and Other Systems on the Basis of a Case of Hemorrhage at the Base of the Brain. E. WENDEROWIC.
XIX. The Action of Subcutaneous Injections of Adrenalin on the Blood Pressure in Dementia Præcox. KARL NEUBÜRGER.
XX. Combined Tuberculin-mercury Treatment of Dementia Paralytica. W. HEINICKE and W. KÜNZEL.
XXI. A Parkinson-like Symptom Complex. C. MINGAZZINI.
XXII. The Structure of the Conus Terminalis. GIERLICH.
XXIII. Epilepsy and Pregnancy. C. MEYER.
XXIV. In Memory of Robert Thomsen. H. KÖNIG.
XXV. An Appreciation of Karl Heilbronner. F. KEHRER.

XIII. *War and the Insane.*—Meyer makes a study of the effect of the war on persons mentally diseased, in relation to their personal reactions, their feeling for their immediate family, and their appreciation of higher sentiments toward their country. Fifty-three patients were studied, about equally divided as to sex, in addition to certain alcoholics. Among the alcoholics, the ego-complex remained conspicuous. Negative results were also obtained from the paralytics and from the senile dements. Seventeen dementia præcox patients gave somewhat varying results, but again without any very positive feelings. In general the somewhat expected conclusion is reached that the egocentric attitude of the patients prevented a serious consideration of the significance of the war. In addition, seventy women patients who had been actually exposed to Russian shell fire likewise showed no material influence on their psychoses.

XIV. *Crowd Suggestion.*—The attempt in this article is made to evaluate the effects of the war on the people at large, with the general recognition that masses of people react differently from the individuals of which the mass is composed. It is pointed out that the final attitude of individuals is very different from the rapidly passing psychical effect on the masses at the beginning of the war, and it is regarded as a good sign of the mental stability of the German race that the first egoistic reaction in the form of a mental epidemic so quickly subsided and gave way to a general altruistic feeling. It is added that another sign of sanity is found in the fact that the efforts of

the suffragettes to transplant their psychosis into Germany proved in vain in spite of the extreme theoretic interest which the movement had aroused in Germany.

XV. *Pseudohypertrophic Paralysis.*—Sala discusses on the basis of 13 cases the important question of the pseudohypertrophic muscular disturbances with histological findings. He concludes that heredity has been very much overrated in the etiology of these cases; that as a matter of fact in nine personally studied the most careful investigation failed to reveal a family tendency, or in fact hereditary predisposition of any sort. He finds in agreement with other investigators that the disease has a very strong predilection for the male sex, only one of his cases being a female. The electrical reactions he finds not simply quantitative diminution, as has been generally maintained, but also qualitative, due, he believes, to the excess of sarkoplasm in the affected muscles. The reactions are typical of sarkoplasm and indicate on the morphological side, therefore, a reversion of muscular substance to the embryonic condition. The histopathology of muscles studied during life is discussed, together with the condition of the motor nerve endings and the neuromuscular spindles. He believes that treatment by strychnia and mild electrical currents, using the negative as the active pole, results in definite effects on the disease in the way of checking its progress. Strong electric currents he regards as distinctly harmful.

XVI. *Hallucinations of Hearing.*—Sokolow, from an elaborate study of the production of hallucinations of hearing, reaches the following general conclusions: Hallucinations of hearing may be experimentally aroused by acoustic and other forms of stimulation, more readily by the first; there is a definite relationship between the pitch of the stimulation and that of the hallucination; the rhythm of the hallucination corresponds to the rhythm of the stimulus; the color scale of the hallucinated object has no relation to the tone scale of the tuning-fork; hallucinations of hearing aroused by electrical stimulation are independent of the character of the current; and finally, there is no relation between the intensity of the electrical current and the tone of the hallucinated word.

XVII. *Sarcoma of Motor Area.*—A report of a case of sarcoma of the left motor region, of interest chiefly from the fact that this is the second case of an intradural or intracranial new growth, operated upon in Argentine, which resulted in cure.

XVIII. *Acoustic and Sensory Pathways.*—Wenderowic describes in detail, on the basis of a brain studied by the Marchi method, the course of certain fiber tracts, together with a description of the technique. Of interest is the observation that the projection zones lie chiefly on the lips and at the base of the fissures, the reason for which is presumed to be developmental and mechanical. From the anatomical-physiological standpoint, cortical areas must be sought, not between visible fissures of the hemisphere convexities, but in the immediate neighborhood of the fissures themselves.

XIX. *Adrenalin and Dementia Præcox.*—As a result of the administration of adrenalin subcutaneously, in cases of dementia præcox, Neubürger finds that approximately 80 per cent. of the catatonic and hebephrenic patients examined showed no or extremely slight elevation of blood pressure, a condition similar to that found in other groups of cases. This observation is of interest and suggests in the writer's opinion the desirability of testing the reaction of schizophrenics, by the use of other poisons of the vegetative nervous system. It should also be shown whether the other actions of adrenalin fail in dementia præcox; as, for example, the mydriasis and glycosuria.

XX. *Paresis and Tuberculin.*—A trial of combined tuberculin and mercury after the method of Wagner von Jauregg has been attempted by the

writers in dementia paralytica. Eight patients were treated with the following therapeutic results: In all, a remission which was almost a cure took place, and especially noteworthy was the improvement in the severe pupillary disturbances. From this experience, it is regarded as justified to make further trial of this treatment. In estimating the results, the writers recognize the natural variations in the course of the disease, but feel that definite possibilities of improvement may be secured, particularly if earlier diagnoses than heretofore are made.

XXI. *Parkinson Syndromes.*—Mingazzini discusses the symptomatology and pathological anatomy of a condition closely resembling Parkinson's disease on the basis of more complete serial sections of the brain and spinal cord than have heretofore been made. A case is carefully reported, both clinically and with the post-mortem findings, in which, during a period of about four years, a paralysis agitans-like tremor, especially marked in the arm, with dysarthria and paresis of the lower facial on the right, together with a final partial sensory aphasia and dementia, was noted. The serial sections showed a loss of substance with fairly sharp boundaries, of the right nucleus caudatus, and partially of the anterior segment of the internal capsule and the lenticularis, together with certain changes in the cortex, in the crural region, in the pons, and in various other parts of the brain stem and cord. There was also an almost complete lack of crossing of the right pyramidal tract. These lesions are studied in relation to the symptoms during life, and the general conclusion drawn that such disturbances may produce signs and symptoms closely resembling those of Parkinson's disease.

XXII. *Conus Terminalis.*—Gierlich discusses the physiology of the conus terminalis, considering that part of the spinal cord which extends from the level of the second sacral segment downward, as the conus. The so-called epiconus includes the first sacral segment and the fifth lumbar segment. This anatomical division is justified by certain more or less definite clinical symptoms resulting from its disease or injury. On the basis of a clinical and pathological study of a case, the following general conclusions are reached: Some of the muscles of the foot are derived from the second sacral segment, whereas others receive contributions from above. The second sacral segment sends motor impulses to the calf muscles as well as to the flexors of the knee and the extensors of the hip; fine sensory fibers entering the conus are for the most part reflex collaterals; the course of various other posterior fibers is described and the endogenous fibers distinguished from those entering the cord; the conus represents a somewhat definite apparatus, which serves for the innervation of the bladder, lower bowel, and the sexual organs; the anal reflex center lies in the conus; if the conus is cut out, the visceral sympathetic centers take on a vicarious function, leading to automatism of the bladder and bowel, with retention of libido and erection but with loss of ejaculation and orgasm.

XXIII. *Epilepsy and Pregnancy.*—Meyer refers at length to the literature regarding the relation of epilepsy and pregnancy, which seems to show that the pregnant state may be the exciting cause of the epilepsy. A more important question is, whether pregnancy influences the course of a preexistent epilepsy, and on the other hand, whether epilepsy may influence the course of pregnancy. Three possibilities must be considered: that pregnancy exerts no influence on epilepsy; that epilepsy improves; or that epilepsy grows more severe during the gravid period. The popular idea that the cure of epilepsy may be brought about by pregnancy is certainly not to be seriously considered. Statistics show that the three possibilities suggested may all occur, and that a good or bad influence on the epilepsy is exerted more often than no effect. We have no knowledge of the cause of this influence but the analogy to other nervous disorders is suggested. The practical impor-

tance of epilepsy in relation to pregnancy comes in relation to the indication for abortion. Such indications exist only in repeated attacks, in states of extreme stupor, and in the imminent danger of the development of hopeless mental disease.

The Psychoanalytic Review

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Abstracted by Louise Brink, A.B.

1. Individuality and Introversion. W. A. White.
2. A Psychoanalytic Study of a Severe Case of Compulsion Neurosis. H. W. Frink.
3. A Summary of Material on the Topical Community of Primitive and Pathological Symbols ("Archeopathic" Symbols.) F. L. Wells.
4. A Literary Forerunner of Freud. H. W. Brown.
5. Technique of Psychoanalysis. S. E. Jelliffe. (*Continued from Vol. III.*)
6. Translation: The Technique of Dream Interpretation. W. Stekel.

1. *Individuality and Introversion.*—White here submits to an examination of the accepted use of the term "individual," thereby rescuing it to a new service in rejuvenated form. It has fallen into that static concreteness, he goes to show, to which our easily accepted formulas all too soon relegate useful terms. The genetic concept, renovating psychopathology, demands for "individual" a much broader meaning that that which applies merely to the span of a single life. "The usual distinction," White says, "between individual and environment is largely artificial . . . the concept 'individual' as implying this distinction has had a distinct history, an evolution, and . . . the distinction which does arise in this way is broken down by introversion, as is particularly well shown in the introversion type of psychoses, dementia præcox." The very gradual differentiation on the part of the child, examples of which are given, between his ego and environment reveals the slow growth of a distinct individuality. The serious gaps in the structure of the ego-concept, familiar to all, illustrate that even in the adult consciousness this differentiation is never complete. Certain portions of the body are always much more clearly than others in the field of awareness, which even the choice of location for hysterical conversion symptoms confirms. Moreover, no one can really say where individuality ends and environment begins, as for example in the taking of food. Evidences from the life of primitive man reveal how little clear this distinction is in the childhood of the race even as among our own children. It is to just such a stage of lack of differentiation that the psychoses return. Like the savage and the child the præcox patient hears voices, sees animation in the objects around him and is acted upon by them. Such patients have lost their power of integration of the self from the not-self. The paranoid projects his feelings upon the environment because of the vagueness into which his individuality has become lost, allowing him to merge himself under another personality, even in most archaic form. He comes to think of himself as the savage chief is regarded, in whom all power over the environment is lodged. The important lesson to be drawn from this is that the individual and the environment are no longer to be regarded as mutually exclusive. At best the terms express simply a relationship. This cannot be translated into terms of concrete finality but forms rather the measure of each one's interest in the environment and the value the latter gains from each one's libido.

2. *A Psychoanalytic Study of a Severe Case of Compulsion Neurosis.*—Frink offers here the first part of the history of a case in order to report as fully as it is possible the actual course of an analysis. Even this must be much abbreviated, but certain features may particularly illustrate important elements in such a treatment. He was able here to verify a good deal of the material from external sources, an unusual circumstance in an analysis. Emphasis is also laid upon the "Displacement of Affects," since the patient manifested in a marked way great and persistent anxiety, remorse and depression concerning those things which she herself rationally realized could not be the actual sources of her suffering. The order in which the various determinants of the illness made their appearance during the analysis was somewhat striking. The gross sexual element appeared spontaneously at the outset while the greatest resistance opposed itself to the late revelation of a non-sexual factor in no way shameful or discreditable in itself. The tenacity with which she held on to the facts concerned with this showed how little the inner wish coöperates in the conscious desire to secure health. The emphasis in this case on the non-sexual is clear proof of the interest of psychoanalysis in the whole of a patient's life and not merely the strictly sexual side, as many critics believe. Frink in this number begins a history of the analysis in some detail. He gives first the history of the onset through an unsatisfying love affair, complicated by fear and distress over possible injury which the patient might have wrought upon her lover through magic, after she had had dealings with a fortune teller in regard to this affair. Then on the occasion of her subsequent marriage this fear was transferred to the husband and also to herself. In regard to the patient's over intense love toward the first lover, Frink concludes that he represents a substitute for or a flight from some other love object, which she would not permit herself to realize. The process of the analysis reveals a father complex which came to expression in a masturbatory experience of earlier years. Another active complex which came to light through the dream was the desire of separation from the husband. She also reported an obsession which had occupied her a considerable time earlier in her life, that of having suffered an assault, which obsession came on at the cessation of the masturbatic experience which she had received at the hands of the father. Behind all these important revelations, however, there were certain inexplicable fears which were evasively expressed and which pointed to some deeply hidden complex still unrevealed. This the author leaves to be explained in the further report of the case.

3. *A Summary of Material on the Topical Community of Primitive and Pathological Symbols ("Archeopathic" Symbols).*—Wells has made accessible a great many universal symbolisms by collecting and arranging them together in topical groups. They form a comparative study of the use of these from mythological belief and ceremonial, hymnology, literary productions, child phantasies and phantasies expressed by psychotic patients. Some of the data, he states, are from his own observation, most of the others are from the works of Jung, Jones, Rank and Frazer. They are listed under I. Miscellaneous Pervasive Symbolisms, II. Solar and Hero Myths, III. Procreative Function of Vapor, Spirit, Mind; Theophagy, IV. Wind, Breath and Sound in Procreative and Allied Functions, V. Symbolism of Intestinal Gases in Fertilizing Rôle, VI. Rationalizations of Dove-symbolism, VII. Snake and Allied Phallic Symbols, VIII. Coitus-Onanism-Fire Symbols, IX. Phallic Symbolism of Sun and Light-Rays, and X. Sex-food Symbolisms. The author suggests for such universal symbols, which were once active in the conscious life but now appear from the unconscious, the name "archeopathic" symbols.

4. *A Literary Forerunner of Freud.*—Attention is called here to the

foreshadowing of the truths which Freud was to discover clearly in the writings of men of literature. Brown selects the poetic works of Mathew Arnold as affording a veritable mine of psychoanalytic truth. His fastidious taste, exquisite culture and extraordinary critical ability kept him upon a high plane of transmutation and glorification of what lies in the depths of man, while also the time in which he lived was not yet ripe for the acceptance of an evolutionary past which should trace back the highest psychical life through baser, less cultural antecedents. Yet he occupied himself frequently with thoughts concerning *a buried life*, to which, however, he had no analytical and interpretive clue. The lines which the author quotes reveal his recognition of a deeper unconscious existence which drives man on eternally. He had not, however, the interpretation which should penetrate this as the life stream of the race and find the races within, through knowing them for what they are. The recognition of the sexual trend the author believes was impossible for him, as it was largely for the age in which he lived. His own inner conflicts prevented him from knowing the content of this unconscious which he felt, and yet he has written: "So long as we are blindly and ignorantly rolled about by the forces of our nature, their contradiction baffles us and lames us; so soon as we have clearly discerned what they are, and begun to apply to them a law of measure, control, and guidance, they may be made to work for our good and to carry us forward." A prophecy, the author suggests, upon which to put our present-day interpretation.

5. *Technique of Psychoanalysis.*—Jelliffe here brings together the various elements previously discussed. These represented the factors in the conflict between the accumulated wishes to remain at lower levels of adaptations and the progressive urge to bring about newer and always more valuable adaptations. He likens the consideration of the human mind from this point of view to the geologist's comprehension of the successive periods of paleontology and geology with their outcrops, their horizons. Just so the accumulation of the unconscious represents a vast region extending from the archaic period to the present day and presents various thought fossils which reveal themselves in the course of the analysis. These then permit of a synthetic appraisal of the psychical trends of the patient, a psychogram, Jelliffe calls it, which enables one to objectify the situation and judge of the dynamic progress in the case. Such a psychogram he explains as follows: An ideal, well-rounded character may be represented by a complete circle, the circumference of which marks the completely socialized libido. The receding circles within may stand for the various levels of development which the libido imperfectly attains. The first circle within he calls the narcissistic, at which the libido is occupied exclusively with itself. Within this again is the stage of organ values, the autoerotic plane, while the lowest stage designated is the archaic, reaching back into the furthest past. These circles are again divided into sectors to represent the partial libido trends. With such a graphic then one may plot the patient's prevailing trends, the dip of the libido back along any of the partial trends to any one of these levels, and thus make it more clear in what form and to what extent earlier forms of adaptation seek to supplant or prevent socialization. Jelliffe illustrates this graphic by certain symptomatic manifestations which dip down to the narcissistic level in eye and bladder areas and by dreams which reveal the return of both nutritive and genital libido to the archaic level. This latter plotting served, in this case, to suggest a diagnosis of dementia præcox, which was later otherwise confirmed. In another dream a reduction of the libido back to the archaic is evident in the regressive use of symbolism, also very significant in prognosis. This leads to a word about the individual use of symbolism, which the author refers to Pawlow's condition reflexes. Just as the bell-ringing had come to be associated for certain dogs with food, so certain symbols have become

conditioned reflexes for certain patients. Anything may be used as a symbol for anything by any individual, but the meaning of the symbol can only be discovered by utilizing *the patient's* free associations. A general knowledge of the significance of certain groups of related symbols which are universal is necessary for the analyst, but the particular use and value of any symbol must be discovered in the patient himself. No cure can be effected without having the patient find out from within what things mean for him, why they do and how this has come to be.

6. *Translation: The Technique of Dream Interpretation.*—Stekel, too, insists upon the impossibility of dream interpretation without the aid of the dreamer. The dreamer's ideas must be scrupulously recorded. One can aid him by asking of what actual experiences the dream reminds him, of what persons the persons of the dream and the like. The patient then talks on and reveals slowly the hidden meaning of the dream. This the author illustrates by a dream and the associations gathered successively throughout a week. It well exemplifies the "fractional" dream interpretation of which Freud speaks. The chain of associations may stop but another part claims attention at the next sitting and reveals a new layer of dream thoughts. Doubt on the part of the patient manifests its relation to the dream material and is merely the resistance to important suppressed material. By the gradual bringing of these associations the dream, which has seemed nonsense to the dreamer, proves the source of an important secret communication and of a great psychic unburdening. Further work leads still deeper into the neurosis, which is in fact contained in the dream. Stekel says that "the dream is a microscopic world, which reproduces in miniature the whole psychic world." The associations of this patient continue to deal not only with his psychical complexes active at the present but lead back into his earliest childhood. The mere symbolic translation, the author says, would have given but one interpretation; it is the patient's associations which have brought out this wealth of interpretive material.

Stekel next gives a series of criminal dreams, the interpretation of which would not have been possible except for an association which arises out of the history of the patient's illness. A very long dream is contrasted with one of which two words only are remembered. The meaning of the long one is discovered largely by a typical symbolism. Everything in the dream leads back to a single thought, which is, however, disguised. The element of absurdity is employed as part of this disguise but is in reality a criticism of the analysis. The associations, on the other hand, concerning the dream with the two words are the only means of interpretation, but lead much more deeply into the neurosis than does the longer dream. The bringing of a single word or the coining of a new one often leads a long way into the interpretation. The patient's conversation, his manifested affects, his reservations, his oppositions and his agreements all belong with his associations to the dream material. This also Stekel illustrates by examples. All these need, however, a knowledge of symbolism and a technique of dream interpretation to guide the patient into a helpful understanding. The elaboration of the dream, its structure whereby it conceals or reveals need also to be thoroughly understood. The theme of a dream appears and reappears so often that the failure to interpret any one dream need be no discouragement. A dream may finally bring a long-desired explanation, or again a multitude of dreams may seek to disguise the important facts by their very number. The psychoanalyst must also watch the dream for a fault in himself or his interpretation. All finally depends upon self-knowledge on the part of the analyst. He must remember that we are all dreamers. He with the same unconscious tendencies must be able to place himself in the unconscious of the dreamer. Dream interpretation is therefore the means by which the "inner criminal" tendencies

are recognized and brought into control. It is the true appreciation of this which enables the physician to deliver his patient from the bonds of his neurosis.

American Journal of Insanity

Abstracted by Dr. C. L. Allen, Los Angeles, Cal.

(Vol. LXXII, No. 4, 1916)

1. Sympathetic Nervous System in the Psychoses. A. Meyerson.
2. Wassermann Test in Psychiatry. L. G. Lowrey.
3. Nipple Sensibility and Mental Disease. M. E. Scheetz.
4. Treatment of Paresis. B. D. Evans and F. H. Thorne.
5. Salvarsanized Serum. D. W. Wardner.
6. Aphasia. A. Gordon.
7. Murder and Expert Testimony. J. W. Putnam.

1. *Sympathetic Nervous System in the Psychoses.*—Only recently has much attention been paid to the sympathetic nervous system and even now there has been comparatively little study of it in nervous and mental disease compared to what has been done on the voluntary nervous system.

The author has utilized the material from fifty consecutive autopsies and has also studied some animal material, confining his examinations, in the main, to the semilunar ganglia. The cells of this ganglion, like those of the posterior spinal ganglia, lie in a capsule lined with endothelium. They are somewhat smaller than those of the Gasserian ganglion and among them are found occasionally cells with double nuclei. Of the pathological changes found, he describes: (1) Axonal reaction, which was found in isolated cells in many of the cases, being quite prominent in five, namely, in an exhaustion psychosis in a woman of 50 dying of cardiac valvular disease, in three cases of enteritis ending fatally (two senile dements, one paresis), in one senile dement dying of pulmonary tuberculosis. (2) Emigration of the nucleolus which was prominent in the case of a dement 95 years old. (3) "Neurathrepsia," by which term the author means a gradual degeneration of the nerve cell, and under this he notes (*a*) pigmentary changes, (*b*) the presence of oxyphile granulations. (4) Nuclear changes, both in the taking of the dye and in the contour. (5) Capsular changes. (6) Increase of connective tissue in the ganglia. No true inflammatory process was ever seen, nor were there any plasma cells, leucocytes or lymphocytes present, though there were a few eosinophile cells, which in the intestine of a bull, which died of tuberculosis, seemed to be phagocytic for the injured nerve cells.

2. *The Wassermann Test in Practical Psychiatry.*—Statistics are presented dealing with the results of the Wassermann test on the blood in 1,600 admissions to the Danvers State Hospital. Of 864 male cases, 164, or 19 per cent., reacted positively. Of 736 female cases, 92, or 12.5 per cent., were positive. There were doubtful reactions in 3.87 per cent. of the cases. If the cases with positive results from the spinal fluid, where the blood reaction was negative or doubtful, are included, there were 273 cases, or 17 per cent., of all admissions (16 per cent. on blood alone). Of 256 cases with positive blood reactions, 145, or 56.7 per cent., were cases of nervous syphilis. Excluding paretics, there were positive reactions in 7.6 per cent. of 1,455 admissions. Of the non-paretic cases with positive blood reaction, 20 are "organic," 80 are "functional" and 10 are "unclassed." If an insane man shows a positive blood reaction, the chances are more than even that he will prove

paretic, while in an insane woman the charges are against the case being one of paresis. A curious thing is the high percentage of positives in morphine habitués. Doubtful Wassermann reactions later show positive results in about one quarter of the cases. Among the paretics the blood was positive in 87.5 per cent., negative in 10.3 per cent.; fluid, positive in 87.2 per cent., negative in 8.5 per cent., both positive in 75 per cent of the cases.

3. *Nipple Area with Reference to Mental Disease.*—W. W. Graves many years ago reported as a stigma of hysteria an anesthesia associated with hyperalgesia of the nipple area of the breasts. The authoress chose for examination ten mental cases in which "a sexual emotional content" appeared to be a prominent exciting factor. The nipple region was tested by light touch, pressure and by pin pricks, the first series of tests being applied to the nipple at rest, the second after it had been caused to erect, then after painful sensations had been removed by sponging off with damp cotton, a series of tests for "free word associations" were made. Her results are summarized as follows:

(1) There is a decrease or lack of sensitiveness to light touch throughout the whole areola-nipple area. (2) Retention but inaccurate localization of pressure sensations under normal conditions. (3) Exaggeration of pain sensations both in the erected and the unerected nipple, but more intense in the former. (4) Increase in sensitivity for pressure and pain stimuli when an erection of the nipples was induced. (5) Reference of the sensations to the true sexual organs, at times on stimulation of the unerected nipple, but in nearly every case when the erected nipple is stimulated. (6) There is probably no great difference between these people and normal individuals otherwise than a possible increase in pathological cases. (7) Reference to the true sexual organs was more constant in these women, but all had had sexual experiences and were of the "sexual type." (8) In most of the cases the associations indicated plainly the sexual content without any further analysis. (9) The anesthesia with hyperalgesia of the nipple area, thought by Graves to be pathognomonic of hysteria, is probably only a slight variation of a normal condition.

4. *The Treatment of Paresis.*—The authors treated in the New Jersey State Hospital at Morris Plains fourteen cases of paresis by the Swift-Ellis method and one by combined intracranial and intraspinous methods. These cases were selected as being thought favorable cases. The largest number of intraspinal injections given in an individual was ten and the smallest three.

Three of these patients showed mental and physical improvement, five showed physical improvement only; two died during the course of treatment; two died ten and thirteen months later, the remainder showed no improvement whatever. One of the three showing mental and physical improvement was discharged, returned to work and received a raise in salary, over fourteen months having elapsed since the last treatment. One was taken home and is lost sight of, one died in convulsions ten months after the last treatment. The number of treatments was insufficient to reduce the Wassermann reaction in either blood or fluid, as many negative reactions being found as in untreated cases. The cell count changes after lumbar puncture independent of any medicinal agents. They have seen just as many cases improve under no special treatment, and consider the amount of salvarsan which can be safely introduced into the central nervous system as too small to control the disease in patients as advanced as those admitted to institutions usually are. The intracranial method seems unnecessary, giving no better results than the intraspinal.

5. *The Intracranial Injection of Salvarsanized Serum.*—The author a year ago reported six cases of paresis treated by his well-known technique, and

now has increased his series to fourteen cases, each patient having had from four to twelve treatments. Of these cases five have improved enough to go back to work and have remained well from seven to eleven months. One had a bad relapse at the end of eleven months, was brought back and treated again and has responded so well that he has the freedom of the grounds and seems all right. Three other cases improved enough to be put on parole and to do efficient work about the hospital. Three more have improved but not enough to be trusted at large. Two have died and the autopsies showed marked paretic changes.

6. *Aphasia and Case of Verbal Amnesia and Alexia.*—The study of a case in which a large glioma involved the supramarginal gyrus, the angular gyrus, the posterior two thirds of the first and second temporal lobes and a small portion of the occipital lobe on the left side. This man (forty-four years old) could understand spoken words and appreciate correctly objects presented to him, could repeat such words, but could not recall the names of objects, so that his ability to converse was greatly limited. He could neither read nor write from dictation. He could not be made to accept the wrong letters when a word was spelled before him, but would shake his head until the proper letter was mentioned. Later he became completely word deaf and word blind. Comparing the case with Wernicke's schema it works out as a case of transcortical motor aphasia, the connection between the motor speech center and the ideational center being severed while the centers themselves should be intact according to Wernicke's idea, clinically presenting the symptoms of retained imitative speech, while spontaneous speech is impaired. The author thinks that this case disproves Wernicke's idea of transcortical aphasia, since the sensory speech centers must have undoubtedly been invaded long before death, before word deafness and word blindness were present. It has always been known that Wernicke's transcortical aphasia is excessively rare, although it has been admitted as a possible variety. Dejerine in all his experience had only met with one case with the symptoms of the motor type, never one of the sensory type. He thinks that while clinically the two forms of Wernicke's aphasia are possible, their interpretation and anatomical localization are quite disputable. Our author thinks that this case also disproves in their absoluteness the views of P. Marie, since the third frontal convolution, the insula and the lenticular zone were all intact and he could not find in it a mental deficit upon which Marie lays such stress.

7. *Murder Case and New Law Governing Expert Testimony.*—Case of a man 43 years old who killed an unoffending stranger because God told him he must kill some one because his mother had been killed in the European war. The patient refused to make any defense or to let Dr. Putnam, who was appointed as an expert by the court, examine him in any way. The jury acquitted him upon the ground of insanity and he was committed to Matteawan.

Revue Neurologique

Abstracted by Dr. C. W. Camp, of Ann Arbor, Mich.

(An. XXII, No. 19, July, 1915)

1. The Process of Cicatrization of Nerves. J. Nageotte.
2. The Abolition of the Plantar Cutaneous Reflex in Certain Cases of Functional Paralysis Accompanied by Anesthesia. J. Dejerine.

1. *Cicatrization of Nerves.*—A series of illustrations and comments.

2. *The Plantar Cutaneous Reflex.*—Three cases of traumatic hysteria in soldiers were shown. In each case there was a monoplegia with contractures

and anesthesia of the paralyzed side. The tendon reflexes were normal. The plantar cutaneous reflex and the "reflex of defense" were absent on the paralyzed side. Babinski, in discussion, said that the abolition of the cutaneous reflexes was due rather to the contracture than to the anesthesia. The patient could voluntarily control the reflex. Déjerine took exception to the statement that a person could voluntarily control these reflexes. He believed that the abolition of the reflex was due to the anesthesia and was comparable to the abolition of the conjunctival reflex due to anesthesia of the conjunctivæ.

(An. XXII, No. 20–21, Aug.–Sept., 1915)

1. Remarks on the Attitude of the Body and on the Sthenic State of the Trunk Muscles in a Case of Disequilibration of Cerebellar Origin. André-Thomas and J. Jumentié.
2. Syndrome of Mass Coagulation and Xanthochromia in a Case of Compression of the Spinal Cord by Spinal Tumor. V. Demole.
3. A Case of Radiculitis. C. Bacaloglu and C. Parhon.

1. *Cerebellar Attitude.*—The patient was a soldier who complained of severe headache and disturbance of equilibrium. There was double choked disc with hemorrhages and partial deafness in the left ear. The knee jerk was absent on the left and diminished on the right, while the Achilles jerk was preserved on the left, but abolished on the right side. The plantar reflex was normal—flexion. In standing the trunk bent to the right. The left shoulder was higher and the distance between the ribs and the anterior superior iliac spine was shorter on the right than on the left. The right hand hung with the dorsal surface forward, the left hand with the radial side forward. The muscles of the abdominal wall were vigorously contracted, especially on the right side. The spine showed a double scoliosis, the concavity in the thoracic region facing to the right. Viewed in profile the trunk inclined backward. In sitting there was also a backward inclination of the trunk. Movements of rotation of the trunk were awkwardly performed. There was no dysmetria or adiadochokinesia of the extremities. The attitude of the body is attributed to a disturbance in the tonus of the muscles for which the author prefers the term "sthenic" to indicate the comparison of the respective force of antagonistic muscles. Necropsy showed a fibroma in the left cerebello-pontile angle, which compressed the left cerebellar hemisphere and involved the restiform body and inferior cerebellar peduncle.

2. *Mass Coagulation and Xanthochromia.*—A woman, age 47 years, was admitted to the hospital for metastatic carcinoma following the removal of the primary growth in the breast. Her complaints were chiefly of vague pains in the legs. A lumbar puncture between the third and fourth lumbar vertebræ gave at first an amber-colored fluid containing flocculent precipitate. After about seven cubic centimeters were withdrawn the fluid came clear and colorless. Another puncture done three weeks later gave the same results, *i. e.*, the first portion was amber-colored and contained twenty-four gm. 0/00 of albumin. After fifteen minutes it coagulated. The second portion was only slightly colored, it contained only 2 gm. 0/00 of albumin and did not show massive coagulation. Autopsy, one month after the first puncture, showed an extradural growth compressing the cauda equina and another compressing the lumbar enlargement. The changes in the spinal fluid were probably due to the isolation of the lumbar cul-de-sac by compression above.

3. *Radiculitis.*—A man, age 24 years, developed sharp, severe pain in the posterior aspect of the right thigh and leg the day after he sat on cold and

damp ground. The tender points of Valleix and Lasègue's sign were present. The tendon reflexes were increased. There was a zone of hypesthesia to touch and pin point on the posterior and external aspect of the left, and vibratory sensibility was abolished in the right leg. The Wassermann reaction on the blood was positive. Some days later the left leg became affected and there was retention of urine. Intravenous injections of cyanate of mercury gradually produced a cure.

MISCELLANY

Tumors of the Ventricles. Peter Bassoe. (Journal A. M. A., Nov. 11, 1916.)

The author reports six cases of tumors in the ventricles of the brain. The first was one of the third ventricle, a soft glioma filling the ventricle and causing secondary hydrocephalus in a boy 14 years old. The other cases were tumors encroaching on the fourth ventricle. One of these gave a clinical picture of cerebellar tumor, though the growth was a small one in the upper part of the fourth ventricle Two of the cases were characterized largely by mental symptoms, in addition to those of ventricular and cerebellar disease. Fourth ventricle tumors are much more common than those of the third ventricle; they also produce hydrocephalus and frequently offer a clinical resemblance to meningitis. Three were operated on, all with disastrous results. In one case repeated lumbar puncture apparently gave temporary relief, but it naturally would more often be found to aggravate the symptoms. Any sudden interference with the intracranial pressure conditions seems to be dangerous. The danger of death from this cause and the difficulty of diagnosis place such cases generally in the inoperable class. Bassoe, however, says he must agree with Anton of Halle that operative removal of tumors of the fourth ventricle is not theoretically impossible. Some of them arise from the choroid plexus and are not attached to the walls, and others are only attached above to the vermis. It would, therefore, seem possible in such cases to enter the ventricle through the vermis, provided that the pressure in the posterior fossa is not too high at the time. The only practical suggestion to offer, says Bassoe, is that if symptoms strongly point to posterior fossa tumor and nothing is found in the cerebellar hemispheres, the surgeon may go a step farther and also explore the fourth ventricle at the same sitting, if a preliminary callosal puncture has been made, or else after an interval of a few days.

The Internal Structure of the Midbrain and Thalamus of Necturus. C. J. Herrick. (Jl. Comp. Neur., Vol. 23, No. 2.)

The brain of the amphibian, *Necturus maculatus,* is very generalized, both in external form and in histological pattern. The external and ventricular surfaces are marked by low eminences, each of which is produced by a group of neurons differentiated for particular types of functional connections (Figs. 62 and 63). These connections of the midbrain and thalamus have been determined in detail and more than thirty fiber tracts connected with these parts have been recognized, some of which are shown diagrammatically in Figs. 64 to 68. The precise functional pattern of these regions having been determined in a generalized type of brain, it is now possible to follow the steps by which the higher correlation centers of the cerebral cortex of reptiles and mammals have been developed from the very primitive reflex mechanisms. The embryological development of these brains may now also be more easily interpreted and developmental features which are functional adaptations to the particular mode of life of the animal distinguished from features of more general value, such as the primitive segmentation of the vertebrate head. (Author's abstract.)

TORSION SPASM. J. Ramsay Hunt. (Journal A. M. A., Nov. 11, 1916.)

The progressive torsion spasm of childhood (dystonia musculorum deformans) is described by Hunt, who discusses its nature and symptomatology, gives the history of his earlier observations and reviews the brief literature of the subject, reporting also six personal observations of his own. To summarize, he says: "The progressive torsion spasm is a disease of childhood first described by Ziehen, and with rare exceptions has been confined to descendants of Russian and Polish Jews. It is essentially a progressive torsion spasm of the trunk and extremities, often associated with hypotonia and sometimes with movements of a more clonic or rhythmic character, suggestive of chorea and athetosis. Tremor movements are occasionally noted. The characteristic feature is the twisting and tractile quality of the spasm with the attendant distortion of the trunk and extremities and the bizarre disturbances of posture, gait and station. Sensation is intact, and there are no symptoms of pyramidal tract involvement. It is a progressive affliction with a limited symptomatology, and may eventually become stationary." The analysis of his personally observed cases at considerable length is also given in the paper. He agrees with the earlier observers that it is an organic affection of the central nervous system. Supporting this view he offers its gradual progression, with the especial character of the motor disturbances, its association with tremor, choreiform and athetoid movements, the gradual generalization of the spasm, the cranial nerves only escaping, and its absolute chronicity. There is also negative evidence in the absence of hysterical stigmata and the mental characteristics of tic. The affliction is progressive and incurable.

A STUDY OF THE ACTION OF SEX HORMONES IN THE FETAL LIFE OF CATTLE. F. R. Lillie. (Journ. Exp. Zool., Vol. 23, No. 2.)

Twins of cattle are derived exclusively from separate zygotes so far as the evidence from sixty-one cases goes. The embryonic membranes of such twins, however, fuse in an early stage (embryos of about 30 mm.) and the blood-vessels of the two individuals anastomose. If one is male and the other female the reproductive system of the latter fails to develop its usual characters, and characters of the male appear instead to a variable extent which appears to depend upon variations in time and degree of the vascular anastomosis. Such individuals have long been known as free-martins. The gonad is testis-like in form and structure owing to complete suppression of the ovarian cortex and hypertrophy of the homologue of the semeniferous tubules. The Müllerian ducts usually degenerate, and the Wolffian ducts may develop into quite typical vasa deferentia; gubernacula arise as in the male; but, save in very exceptional cases, the external organs of reproduction and the mammary gland conform to the female type. In rare cases (about one in eight cases of two-sexed twins) the vascular anastomosis fails to develop, and in such cases the female is normal. No abnormalities of the reproductive system of the male arise in two-sexed twins. Sex-determination in the zygotic sense is thus seen not to be the exclusive determiner of sex-differentiation in mammals, even in respect to the most fundamental sex-characteristics. The possibility of complete sexual inversion, by means of hormones of the opposite sex, and of control of sex-determination in this sense, is thus postulated. (Author's abstract.)

SPINAL DRAINAGE TREATMENT. L. B. Pilsbury. (Journal A. M. A., Jan. 27, 1917.)

Pilsbury holds that, in spite of the extensive discussion of the subject in the literature, there is no essential difference or valid line of distinction be-

tween cerebral syphilis and paresis, or any essential difference in the spirochetes of the two conditions, though there is experimental evidence to support the view that the organism that attacks the brain is somewhat different from that which cripples the heart or assails the liver. There seems also to be no reason for making the distinction in treatment between paresis and cerebrospinal syphilis, and he takes up the query of Gilpin and Early whether it is not reasonable to think that reduced pressure within the cerebral spinal cavity might aid in securing the direct effects of drugs such as arsenic and mercury. On theoretical grounds it does not seem that the weekly removal of 20 or 40 c.c. should have more than a very transient effect in reducing pressure, and it seems probable that spontaneous variation may occur, though doubtless in less degree. The fluid is probably rapidly replaced and such rapidity may, it is conceivable, happen to carry over foreign substances circulating in the blood at the time. At any rate the method seems to be worth trying, and it was tried by him in ten cases of paresis, taboparesis and cerebrospinal syphilis. The amount of fluid withdrawn varied from 20 to 35 c.c. The Wassermann was performed with 1 c.c. of fluid and the cells counted in the Thoma-Zeiss chamber with the high power. The patients were not selected. Some of them would be a severe test for any form of treatment. On the whole, the results are not striking, and similar effects might reasonably be expected without spinal drainage. One of the patients is decidedly better, and several slightly so, but the one who improved had an alcoholic factor in his case. The cases are reported and the findings in the cerebrospinal fluid tabulated.

The Olfactory Organs of Lepidoptera. N. E. McIndoo. (Jour. Morph., 29, 1917, No. 1.)

Since 1911 the writer has made a special study of the olfactory organs in spiders and insects In spiders they are called lyriform organs, because their external appearance resembles a lyre. In insects they were originally called vesicles, but the present writer has called them olfactory pores, because it was determined experimentally that they receive chemical stimuli and the anatomy of them showed that each organ is a minute pore or hole through the integument, inside of which lies a spindle-shaped sense cell whose outer end runs into the funnel-shaped pore and consequently comes in direct contact with the external air. The inner end of the sense cell runs directly to a larger nerve.

Up to date the writer has made a comprehensive study of the olfactory pores in the honey bee, Hymenoptera, Coleoptera, and now Lepidoptera, and has just finished a study of them in a copeopterous larva.

In Lepidoptera the olfactory pores are widely distributed on the legs, on both pairs of wings and occasionally on the mouth parts. Considering the forty species, belonging to thirty-six genera and representing nineteen families which were used in this study, the number of pores on the legs varies from 71 to 240; on the front wings from 52 to 662; on the hind wings from 45 to 663; and on the mouth parts from 0 to 59. The total number of pores varies from 222 to 1422. The structure of these pores is similar to that of those in other insects. (Author's abstract.)

Book Reviews

WITCHCRAFT IN SALEM VILLAGE IN 1692. TOGETHER WITH A REVIEW OF THE OPINIONS OF MODERN WRITERS AND PSYCHOLOGISTS IN REGARD TO OUTBREAK OF THE EVIL IN AMERICA. By Winfield S. Nevins. Fifth Edition, with New Preface of Striking Interest. The Salem Press Company, Salem, Mass. Price $2.25.

The preface gives this newly published edition the particular historical value which it should have to the medical psychologist, for it calls attention emphatically to the following important fact. The psychical epidemic appearing in such force in Salem village in 1692 that it brought to vilest condemnation and death numbers of law-abiding citizens of sterling worth, was not an isolated fact of strange and startling character.

Such prosecution of witchcraft was common to the civilized world at that time and was based upon a belief which was very real and compelling to the victims of the persecution as well as to the accusers. It reveals the unity of the human mind in its slow development which has yet scarcely outgrown a belief in witchcraft and alliance with the powers of evil. Now, however, as the author points out, social enlightenment and tolerance prevent such an era of active persecution.

The atrocities of this year of 1692 in Salem village mark truly a psychopathologic epidemic which passed over the community. The psychic infection and contagion which once launched could not be stayed until its violence brought its own reaction are not unknown in other ways and forms even to-day. The records of proceedings are too meager to permit of complete diagnosis, but are full of psychopathological interest in their suggestiveness. The weight attributed to the hysterical depositions of the witnesses, particularly those of the child Ann Putnam and her subsequent confession concerning them, bear thoughtful investigation, but no less does the ready credulity and grave acceptance of these testimonies by the authorities of highest standing and most responsible positions in the village and Commonwealth.

The light which psychoanalysis has thrown upon the apparitions of the unconscious, whether as simply hysterical conviction or in more concrete form, and their obsessional influence upon the individual gives especial interpretative value to the details of these depositions and grants also a more sympathetic understanding of the weight they bore in the minds of the accusers and the judges. It assists also in the comprehension of the harshness and abject cruelty both of the punishments and of the efforts to obtain acknowledgment of guilt, since these were directed toward the destruction of a depth of guilty abasement which at that age was actually believed to exist.

JELLIFFE.

MAN—AN ADAPTIVE MECHANISM. By George W. Crile, F.A.C.S. Edited by Annette Austin, A.B. The Macmillan Company, New York. 1916.

This book is an amplification of material which has been published in part by the author at an earlier time. It receives here a fuller treatment from the practical standpoint of experiment and working hypothesis, while in its literary form it is stimulating, vigorous, a completed synthetic whole. Particularly in the earlier part of the work the stimulus of romance sur-

rounds the bare scientific facts because this rightfully belongs to their origin in the marvelous development of human life.

This quality which seizes and holds the attention by no means excludes or obscures scientific accuracy. The hypotheses given are based upon careful experimental data, substantiated as far as possible and then merely offered as working hypotheses for further investigation as well as for a more intelligent control of the human organism in medicine and operative surgery.

Man's gradual adaptation to environment is traced in its relation to the building up of an organism to meet the demands made upon it by an environment requiring mechanisms of defence, food-getting and procreation. Thus there have been developed through phylogenetic history definite reaction patterns of which we are the inheritors. The nervous system is the product of this adaptation to environment and it presents to the stimuli coming toward the organism three classes of receptors, each with its particular form of reaction. These are the *contact ceptors* which lead to discharges of energy limited to a small part of the organism, *distance ceptors* stimulating large stores of energy and involving the organism as a whole and *chemical ceptors* in the inner tissues through which purely chemical reactions are initiated.

Thus each organism, human or otherwise, is primarily a transformer of energy derived from the environment and returned in heat, motion, work performed, etc. Fear and other emotions, therefore, activate the body according to the ancestral patterns by which response was made to the objects calling forth such emotions and exhaust energy in just so far as they represent the original physical activity.

There is, the author goes on to show, a system of organs specifically developed for the transformation of potential energy for the bodily kinetic activity. These are the brain, which acts as the central driving battery, the adrenals, which through their secretion stimulate the brain, the liver which makes and stores glycogen and neutralizes the toxic acid products of energy transformation, the muscles in which latent energy is transformed into heat and motion, and the thyroid which is the pace maker for the activating brain.

Increased activity in any one of these organs produces corresponding increase in the others, while conversely, loss or impairment of function in any one results in like loss and impairment of the entire system. The effect then of injury, of emotion, of infection, of any stimulus from the environment is to drive this kinetic system. Control and regulation of its action may be secured by "anociation" secured by preventing or diminishing the number or intensity of stimuli entering the brain and thus activating this system. This is of particular value in operative surgery where these principles are beginning to bear fruit, but the principle is applicable to any means, physical or psychical, which modify this energy transformation, the effects of which, whatever the cause of excessive activation, are apparent in every part of the kinetic system. This admits also explanation for the curative effect of various forms of psychotherapy, which substitute a tranquil psychical attitude or an effective and safe discharge of energy for the fruitlessly activating emotional states which only serve to wear out the mechanism.

In all this, in the reactions built up to environmental stimuli, in the disproportionate and hurtful effect of certain stimuli and the possibility of their control, the author sees simply "man—as an adaptive mechanism." His point of view and this clear and instructive analysis of it forms an indispensable background for a still broader view. It should go hand in hand with a fuller conception of the action of mind through body. It is the psychical life of man that is doubtless implied in the discussion of adaptation to distance ceptors. A fuller consideration of this is needed, however, to discover the broader rôle of the symbolic life of man which gives him such play of adaptation as belongs to this level of his response and lifts him above the merely mechanistic being to a place of creative freedom of activity.

The illustrations of the book, drawn freely from various phases of life and from extended laboratory experiments, add much to the value of the work. The former strikingly illustrate the development of the author's thought, while the latter give distinct proof of his carefully tested theories concerning the results of stimulation.

JELLIFFE.

THE MYTHOLOGY OF ALL RACES. In Thirteen Volumes. Louis Herbert Gray, A.M., Ph.D., Editor; George Foot Moore, A.M., D.D., LL.D., Consulting Editor. Volume I, Greek and Roman. By William Sherwood Fox, A.M., Ph.D. Marshall Jones Company, Boston.

The importance of such a modern collection which records and preserves ancient myths is explained in the editors' introductions to this series, contained in the first volume. Myths are indeed a record of the thought of early man in the childhood of the race. Mythology truly deserves that sympathetic appreciation which should be accorded to any attempt of the human race in any age to interpret facts and discover causes. This wide collection of the myths of the world should teach modern man much of that earlier speculation of which he is heir. Moreover these are presented without the fixity of some special theory of mythology to substantiate, which makes of them a fund of material for broad and comparative investigation of particular value.

In spite of this, however, some limitation seems to be already set in these views of the editors just mentioned and in the emphasis laid upon myth as the explanation of religion. The author of this first volume permits himself, likewise, a certain amount of rationalistic interpretation even with his comprehensive and genetic conception of the origin of the myths and the gods of Greece and Rome. This is inevitable if one remains only upon the conscious level of explanation and understanding. That allows for the genetic viewpoint only so far as it can be followed along the superficial and evident course of man's development, which secures an outward crystallization in the form of myth, legend, religious cult and pantheon along the way.

To reach the real interpretation which lies beneath all this, informs it, raises it also to later rationalistic explanation and these ethical refinements which the author suggests, for this the unconscious must be probed. There must be appreciation of the deeper emotional life of man which both made his myths out of his religion and his religion out of his myths, and which more profoundly moved him toward this projected expression of his wishes which were otherwise meeting denial with the growing complexity of cultural demands. This need of expression for the gradually repressed emotional wish-self was probably a powerful factor, which must not be neglected in valuation and understanding of myths. Such necessity doubtless lay behind and through the nature explanation and the seeking for causes as it had also its share in the constant alteration of myth with progress.

Nevertheless, this volume is written in a spirit of recognition of change and growth. It seeks to discover origins in earliest archaic beginnings but always on the surface of the ancient world. The author has gathered widely and presented thus the myths and divinities as they may be found by patient research close to the earliest history of these peoples and from a diversity of native soil. He has also traced, with a broad conception of their place in the growing life of the people and their national development, the transformation into the accepted legends and deities of later history.

He offers much, however, as one must who so faithfully portrays the myths of these countries, particularly the imaginative Greeks, that is in itself rich in suggestion of that deeper emotional value, that fundamental seeking

for expression which found such abundant symbolic form for its language in tale, cult and belief.

The author draws a striking contrast between the abundance and fertility of the Greek imagination and the poverty of the matter of fact Latin and Roman mind, which had many gods or numina, but endowed with few such personal elements as the richly colored Greek mythology. Many of their gods were native, though they were later modified by identification with those of Greece, while others were directly imported thence or from further east. The illustrations of the book are drawn from a wide range of ancient art often from the less well known sources and add much to the interest and value of the book.

JELLIFFE.

THE EFFECT OF HUMIDITY ON NERVOUSNESS AND ON GENERAL EFFICIENCY. By Lorle Ida Stecher, Ph.D. Archives of Psychology, edited by R. S. Woodworth. No. 38, December, 1916. Columbia University Contributions to Philosophy and Psychology, Vol. XXV, No. 3. The Science Press, New York.

This is an account of experiments undertaken as part of an investigation carried on by the New York State Commission on Ventilation. The monograph contains not only the detailed report of the method of investigation, which concerned the question of humidity, but devotes considerable space to a discussion of the past history of such investigation of atmospheric conditions. She gives the variety of opinions formed and conclusions reached, all of which she admits lack final conviction or any appreciable advance in knowledge of what constitutes "good" air together with little evidence of the evil effects of "bad" air.

Chiefly convincing is the impossibility of arriving at a practical comprehension of the influence of the environmental factors included under atmospheric conditions upon human welfare and efficiency, through experiments carried on in the purely static, superficial fashion which governs psychological experiment and seems alone to give the direction to most psychological thought. There was promise in the author's discussion of former experiments and evaluations of a recognition of this, but the following elaborate report which is the chief feature of the monograph proceeds along the same futile lines as the experiments themselves prove to have done.

The value and influence of these environmental factors is by no means to be denied, but unless they are considered in the light of all the dimensions of human life, as but one series of contact points at which the immeasurable possibility of each individual being manifests his diversity of response and adaptation to environment, no amount of experimentation can arrive at practical results.

JELLIFFE.

THE WORN DOORSTEP. By Margaret Sherwood. Little, Brown and Company, Boston.

Sublimation does not easily find its way. Phantasy is sweet and especially in the upheaval of a great emotion it lures to its world of unreality and therefore of final destruction. For this reason there is strong and practical help in the story of one who learned to resist phantasy's attraction and leave it finally only as that background of life where reality finds inspiration and receives the glow of a pleasure premium which streams behind its sterner forward urge.

Margaret Sherwood has taken such a phantasy out of the tragedy of war

and made it the cradle of a new birth. The heroine is left alone by the death of her lover and alone hunts out the English cottage where they might have lived, fits it up with all the subtle charm of home and retires there to live with the phantasy, almost of his actual presence. But her mind is healthily of this world. For a free libido such as hers reality at once comes knocking at the door. Rather it comes first flashing from the heels of the spirited little pony which presents a challenge of defiance to any preconceived dreams of indolent or uninterrupted nursing of grief and luxury of quiet dreaming. Thus life proceeds. There is never forgetfulness of the love that forms the background and the incentive but there is also no idle pain. From the tiny black kitten which first creeps over the doorstep, through the refugees who wear its sill one after another, to the forsaken baby who at last comes to fill life, the stimulus of reality is inexorable in keeping the heroine to her place in the world. Even the baby who comes to fill her heart is brought her because her urging drives on the man Peter to his duty in France.

The delicacy with which this whole story is suggested, not baldly told, can best express, in its own language, its message to all who seek to find the true sublimation pathway or to help struggling ones to find it. "I started out," the heroine says, in one of her diary letters to her dead lover, "to tell my story, to you and to myself, for comfort in the long silences, and lo! I have no story; I do not seem to be merely I, I have gone out of myself and cannot find my way back." The goal, this is, of the untiring work of psychoanalysis with every patient who suffers and struggles, to go out of self with libido so free that there is no finding of the way back.

L. Brink.

Recollections of an Alienist. Personal and Professional. By Allan McLane Hamilton, M.D., LL.D., F.R.S. (Edin.). George H. Doran Company, New York.

Rare are the lives of such diversity of interest and experience which are able to portray themselves in the manner of this book. The personal element gives a familiar human setting to a long line of events and experiences of public significance. Description and history from a largely unwritten past include men and events which belong to this city, the country, London, or to remote unfrequented places abroad. It is a pleasant and instructive chronicle of the comings and goings of men of interest and achievement in the author's long life and of his share in the development of events.

His chapters upon the early days of his professional life revive the memory of past medical leaders and recall what they gave to medical training, while at the same time they point the contrast between some of the older ways of obtaining a medical education and the more efficient methods which modern science has evolved. The presentation of the author's own difficulties in his early professional career marks the beginning of that zeal for social reform through medicine to which he has devoted his energies in a variety of ways.

Conspicuous among these are his arraignment of the inadequacy of present day medico-legal procedure, the barbarism of capital punishment and the form in which it is executed and the tardiness of this country to adopt more reasonable and humane treatment of the mentally diseased.

In the wide reference to his experience, however, there is felt a lack of that interpretative attitude toward psychiatrical problems which the public is coming to demand. Various passages seem still to exclude the appreciation of the energic conception of mental disease, wherein must be effective

understanding of these problems and the true stimulus which compels reform. Nevertheless, Dr. Hamilton's practical suggestions, which he has not only promulgated but already to a certain extent pressed into activity lead along the way of progress and have destroyed some of the barriers of prejudice which stand in the path. The book is a genial and practical memorial of a long and useful life.

JELLIFFE.

A PRACTICAL TREATISE ON DISORDERS OF THE SEXUAL FUNCTION IN THE MALE AND FEMALE. By Max Hühner, M.D. F. A. Davis Company, Philadelphia; Stanley Phillips, London.

In the broadening conception of all disorders to which medicine is tending, this book reveals decided limitations. We are growing accustomed to thinking of individual expression and attempt at adaptation upon several layers of activity. Therefore to insist, predominantly, in the interests of genito-urinary treatment, upon the reaction at reflex levels and without due regard to the effect upon psychic conditions of such treatment, as well as without appreciation of psychic causes for these disorders, gives the discussions but a circumscribed and moreover a questionable value.

Hühner acknowledges the work of the neurologist as complementary to that of his specialty. His use of the term neurologist, however, seems to embrace not much more than the conception of one who uses a few nerve tonics and sedatives. Psychic and electrical treatment are synonymous terms. For one who classes together "such conditions as psychoanalysis or the various forms of sexual degeneracies or perversions" one cannot expect a very clear idea or complete evaluation of psychical causes in sexual disorders and psychical investigation and treatment to remedy them.

Therefore it is not strange also to find the sexual neurosis conceived mostly as a physical condition and emphasis laid insistently upon the value of physical manipulation as curative. It is certainly time to awaken to the influence of the psychical control of physical reactions resulting in health or disease and the tremendous importance of the symbolic value which reactions acquire and exercise in the sexual functions most of all, when such stress is laid upon pleasure producing manipulations. How will reëducation of the pathological child or reëducation of the disordered adult proceed if the physician resorts to manual treatment and manipulation in the case of the one or the other? Moreover, the so-called "psychic" effect of the insertion of the lighted endoscope carries a note of the far-away reassuring effects of the magician and his cures, effects which man's unconscious wish still seeks in its pathological return to primitive estates, but surely none which the modern physician would foster.

The good descriptive work of the book in regard to the physiology of the sexual mechanism as well as its pathological response to abuse is instructive. The author aims also at a high ideal of the use of sexuality but with such a restricted outlook he offers no efficient help in the attaining of the well-regulated life of the complete man. Had he ever contemplated actual psychical values he might have informed his reader why the repeatedly condemned egg and oyster must be avoided in these disorders.

JELLIFFE.

MR. BRITLING SEES IT THROUGH. H. G. Wells. The MacMillan Co., New York. INSTINCT OF THE HERD IN PEACE AND WAR. W. Trotter. The Macmillan Co.

Both of these authors have written of the war. The work of each has won deserved renown. Yet it is with a very different feeling that the reader

lays down the two volumes. The well-chosen title with which H. G. Wells puzzles the prospective reader later weaves such a magic spell about him that at the close of the book he can no longer separate Mr. Wells, the author, from Mr. Britling, the great human soul, made great by the slow seeping of the world struggle through his inmost being working its transformation as it goes.

Mr. Britling sees it *through*—and there is the key to the unison of feeling, the chastening of soul, the ultimate consoling belief in the profundity of things which alone can find any transcending human meaning in the frightful brutality and wastefulness of the present struggle of nations. Mr. Britling is no less a Briton, a true loyal Briton, than Trotter. Both must face the conflict not as onlookers but as sharers in the national bewilderment and distress and yet the mighty determined effort toward the triumph of justice and that true form of progress which grants place to the weak as well as the strong.

Trotter's "Instincts of the Herd in Peace and War" is essentially a genetic, interpretative study which presents a contrast to the older anthropocentric biology which stood bewildered before the inexplicable incompatibility between its ideal and the actualities of war, bloodshed and horror. He finds man's place rather in the "great tissue of reality" which has room in the course of development and explanation for apparently antagonistic elements. The herd instinct is one of the very important factors in man's progress and in its halting course as well, and is utilizable for predicting and controlling his future behavior and social development.

This basal instinct has drawn men together, caused them to advance in great groups, thus giving safety and security while they developed, but sometimes hindering also the evolution and progress of individual initiative until a strong leader stepped forward here and there to win the herd again to a forward march along an advanced pathway. This instinct has manifested itself in two chief forms, the socialized type of gregariousness and the aggressive type. The former finds its extreme illustration in the closed insect colonies where socialization is so complete that no further advance is possible. The aggressiveness of the wolf pack, snarling, on the defensive and mastering by force even in its own limits, represents the other. This is a relic of the past which must be overcome, banished from present society, while the socialized type escaping through the versatility and possibilities inherent in human nature the fixity of insect society, is that on which progress must be based.

Trotter then separates the leading nations of the world, ranging them generally upon the side of socialized gregariousness but reserving Germany as the exponent of the aggressive, which element must be destroyed. He does not deny to her a consideration of her wider national aims and a psychological appreciation of the development which has brought her into the position in which she now stands. Yet to a large extent he excludes her from the greater common humanity of the struggle because he fails to attain to the end of Mr. Britling's vision.

The latter begins where Trotter and every other true Briton must have begun, in incredulous astonishment at first, then in insulted horror as the invasion of Belgium inaugurated the series of painful events which were to mark the war. The sense of bitter cleavage and sharp racial distinction which one gets from Trotter's discussion speaks, however, of a blinding to the deeper side of the struggle, even of a certain injustice which is a limited partisanship. The acerbity manifested in the dwelling upon details of atrocities makes one question the possible obscuring of authenticity by a bitterness which naturally belongs to participation in the national dissension. The scathing quality in the sharp classification of the enemy upon the side of

aggressive, lupine gregariousness savors of the very thing the author condemns.

In would indeed be impossible to speak thus justifiably of these words and sentiments from the vantage point of distance and neutrality had not Mr. Britling himself shown us the better way. Slowly the details which at first appall him merge into the deeper pain which embraces a larger view. Mr. Britling, the daring, energetic thinker, so swift of mind that he often fails to find his goal, like this also in adventure after uncertain pleasure, this man is granted long opportunity to learn the surer measurement of searching thought, the discipline of careful weighing and prolonged, far-reaching inquiry into the very soul of nations as of individuals. Out of it he is to win not only a message for all humanity but a personal development which is an individualized, concrete testimony to all this, a mature depth of thought which is no longer like his earlier brilliancy, "a thin treachery to the impulse of his heart."

The tedious nights of patrol duty, when even danger withdrew its inspiration and incentive, gave him opportunity to face the weary futility of the war from the side of inactive waiting. Then follows the mental conflict as passion and reason battle through the night after danger had taken on concrete and actual form and the crueler stinging futility of attack upon helpless women and children pressed sore upon him. Under the clear stars he curses the men who had sailed away in their Zeppelin after dropping the bomb that had killed his aged relative. His maddening thoughts draw for themselves in characteristic way a wider and wider circle, when suddenly through it appears a gleam of light.

It arose from the common humanity of mistake and weakness, the often hideous trial and error method by which alone mankind has made and can make any progress. These had engulfed not alone the Germany of his wrath and hatred but his own nation, all the nations, as well. His invective changes to the century old prayer which suddenly thrusts itself upon his thought. "Father forgive them, for they know not what they do" breaks through the darkness as he comes to include his enemies in the pitying scheme of things which looks into past human determinants and onward into a better future toward which Germany, like England, like France, like Russia, like agonizing Belgium, is nevertheless groping, for which after all she is feeling. The failures, the glaring faults, do not lie with Germany and with her history alone. As she shares the human weakness and failure, so also she belongs to the larger vision of the future.

Such cleavage lines as those which Trotter has set for his reader melt away in the crucible fires to which his own as well as other nations are submitted in Mr. Britling's deep soliloquies. It is only "a gleam of light" which he can yet see in the darkness still heavy and black about him and his nation and the cause for which the nations were fighting. "It was a gleam of light far beyond the limits of his own life, far beyond the life of his son. . . . Between it and himself stretched the weary generations still to come . . . years full of pitiful things. . . . He was no longer thinking of the Germans as diabolical. They were human; they had a case. It was a stupid case. . . . How stupid were all our cases! What was it we missed?"

Wells' choice of title for his book does not presage the end of the war. He could use such a designation and the book could come to its own when that end still hung in the balance. Its concern is far beyond even the decisive outcome of the struggle which is counted in terms of men and trenches, battles won, or of national boundaries, or yet of international security and justice.

Mr. Britling has still to travel a long road, an unutterably weary one before his vision has found the end. For it is the inexpressible burden of such a destructive wasteful war as this, shorn of glory and romance, afford-

ing scant opportunity for inspiring heroism, prolonged, ineffectual on the one hand through indifference to preparedness and through mismanagement, terribly efficient on the other through the utmost refinements of the skillful machinations which science can devise. It perpetrates thus a wholesale slaughter and blind combat with the enemy which bring only utter disgust and weariness to those who partake.

Wells has voiced it as far as it is possible in the letters from Mr Britling's son, whether from the detention camps or later from the trenches themselves, letters which portray with the firsthand reality of a witness, more than that of an actual participant in the great economic waste, the deplorable anachronism which has thrust its hideous shape out through civilization. Through this means the dull, heavy reality of it forces itself slowly and inescapably upon the reader. In this was Mr. Britling to see it through down to the very dregs that he might build again in his thought the newer purpose, the fuller reality of nations. Thus was Mr. Britling himself to arise to a breadth and purpose of life which he had never known before.

Mr. Britling's love and his immortality were centered in this son. His thoughts had earlier than this kept wondering vigil as he realized the hope for himself which lay here in the life which was after all apart from his and bound upon its own career. He would not have stayed this if he could. Now, however, this son was gone from him but even more from that sphere of activity which the future held out to him and all this promise was laid waste. Mr. Britling would not have had even this otherwise. His son was following the call which he himself would gladly have answered. He was meeting the obligation from which father like son would have had no shrinking.

Still it was waste. There was nothing in this war that did not run counter to ideals. When the end comes Mr. Britling cannot forget that the shell had torn into Hugh's brain and spilled out that precious substance which was to have accomplished so much. The burden of the loss of youth with its unworn vigor, its abilities and powers which were to have done the great things of which civilization stands in need presses upon him in the sharpness of personal loss and grief. Only the consummate skill of an author like Wells could thus pierce to the depths of a personal tragedy and voice through it the world's burden. Only such insight and comprehensive vision as he gives to his hero can come to find this the source out of which shall flow forth a widening stream of human pity, love, hope which embraces one's own nation and that nation's foe as well as that nation's allies in the common cause.

Mr. Britling had cherished a keen conception of the creative force lodged in the life of his son, this elder son peculiarly the child of his love and his hope. He has learned now a broader conception of the creation which is in the hands of the race. He has come to know a God, a Power, call it what you will, who is working with mankind, not above, apart, allowing cruelty and waste, but striving with man in the creation in which man has his part, into which the nations must come out of their chastening of sorrow, of mistake and wrong. His own efforts in this direction are very feeble, they are scarcely directed, but he is one with this Power. "Though the way is long and hard the spirit of hope, the spirit of creation . . . must end in victory."

It is the artist in Wells that has brought us by way of the loss of this animated, alert portion of creation and of creative activity which was Mr. Britling's son, through to this realization of that larger unrestrainable creative stream which embraces every individual and every nation, and which flows even through such destructive disaster as that still devastating the world, and outflows it. Mr. Britling's personal sorrow links him to this finally through the death of the son of Germany who had once been an inmate of his home. And so Mr. Britling finally sees it through in the long night he spends trying

to reconcile his loss and that of the German boy's parents with the greater meaning and its purpose and obligation for the future.

The superiority of Wells' treatment over that of Trotter does not lie in the form of fiction which Wells has adopted. It is rather in the cosmic scope of the message the latter has to offer to the thinking world. Trotter's attempt to submit both England and Germany to the psychological and genetic test fails of this larger vision and leaves his reader in a bitterness directed one way or the other. Wells' conception embraces Trotter's effort and carries it further. There is enough futile rage and bitterness expended. They can never bring peace nor heal the gaping wounds of Europe.

The chastening of soul which the reader inevitably shares with Mr. Britling must expand his thought and sympathy and must moreover bring him out nearer to that realization of an international, a racial need crying from the very soul of humanity struggling to its self knowledge and a self expression which is the possession and the opportunity of the creative impulse by which alone it can live.

Wells is an artist in that great sense of the word which denotes an insight into the profound depths of human nature, its passions and weaknesses as well as its unquenchable striving. He has likewise that breadth of comprehension which gives him the wider, fuller understanding which dissolves barriers and finds the common aim beyond the weaknesses, failures, mistakes. The form and style of his book mark too the simplicity of the true artist. All this speaks with no less power to thoughtful men. The clamorings of greed, of personal advantage and gain, of national prejudice and hatred and bitter judgments may well be hushed before a chronicle such as this. The insight and breadth of vision which the author has developed in his hero and through him toward the world struggle may well sink into the thought and attitude of the statesmen who stand before these world problems. It is given to the artist to see far into the depths where causes and interpretations lie and into the future of possibilities and opportunities. It remains for the men of action to accept his message and make it actual.

LOUISE BRINK.

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THE PATHOLOGY OF THE NERVOUS SYSTEM IN A CASE OF PROGRESSIVE LENTICULAR DEGENERATION*

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In 1912 Wilson[1] described the disease which bears his name. Progressive lenticular degeneration is a disease which occurs in young people. It is often familial but not congenital or hereditary; it is essentially and chiefly a disease of the extrapyramidal motor system. It is characterized by involuntary movements, usually of the nature of tremor, dysarthria, dysphagia, muscular weakness, spasticity and contractures with progressive emaciation. With these may be associated emotionalism and certain symptoms of a mental nature. It is progressive, and after a longer or shorter period, fatal. Pathologically it is characterized predominantly by bilateral degeneration of the lenticular nucleus and, in addition, cirrhosis of the liver is constantly found, the latter morbid condition rarely, if ever, giving rise to symptoms during the life of the patient.

This disease is but one of a number of diseases of the lenticular nucleus. Among the group may be included pseudo-sclerosis of Westphal and Strümpell, Parkinson's disease, Huntington's chorea, dystonia musculorum deformans, spastic pseudobulbar paralysis of Oppenheim and Vogt, and progressive athetosis (Spiller[2]).

Wilson himself now regards his disease to be nearly related to pseudo-sclerosis.

* Read before the Chicago Neurological Society, May 17, 1917.
[1] Wilson, Brain, Vol. 34, 1912, Part IV.
[2] Spiller, Jour. of Nerv. and Ment. Dis., 1916, Vol. 43, p. 23.

Strümpell[3] regards Wilson's disease as a type of pseudo-sclerosis and has collected their several symptoms referable to tone into a complex which he terms the amyostatic symptom complex. The amyostatic symptom complex occurs in different diseases, which are apparently very closely related to each other in anatomic physiological causes, although they may present great differences from the etiological standpoint. We have on the one hand, included in the infantile or juvenile, frequently hereditary or familial types, the so-called pseudo-sclerosis, Wilson's disease, etc.; on the other, which appears in older persons, a disease picture which is related to paralysis agitans. Many of the cases known under the name of juvenile or hereditary paralysis agitans probably belong to the first group. In the two groups the disease pictures are classified according to the predominance and grouping of the single symptoms. The symptoms to be considered are, first, the tremor and athetoid movements; second, the muscle rigidity (static muscle rigidity) with its accompanying symptoms (contractures, clumsiness, etc.); third, speech disturbance often in connection with dysphagia; fourth, psychical disturbances, slowly progressing dementia. Fifth, the accompanying liver disease and pigmentation of the cornea.

The pathology of Wilson's disease is quite characteristic. A bilateral symmetrical degeneration of the putamen and globus pallidus is seen. Various degrees of this degeneration are found from discoloration and sponginess, through shrinkage and atrophy, to complete disintegration and excavation of the ganglion. The neighboring structures are involved to a much less degree.

The optic thalamus is practically always normal and the internal capsule is intact from end to end. The caudate is often rather shrunken. The nerve fibers and the nerve cells of the normal nucleus disappear. Körnchenzellen and macrophages are frequently present. The pons, medulla and cord are uniformly negative. This is also true of the nerves and muscles. In advanced cases there is degeneration of the ansa lenticularis, relative atrophy of the corpus Luysii, partial degeneration of the lenticular bundle of Forel and of the strio Luysium fibers and degeneration of the strio-thalamic fibers. The liver is always cirrhosed from hepatitis. It is firm, hard and presents the appearance of rounded nodules of liver tissue clustered together, of the size of hazel nuts or larger, separated by depressed cirrhotic bands. Microscopically are found normal areas, necrosed areas, fattily degenerated areas, and actively regenerating areas scattered irregularly through the organ. In some

[3] Strümpell, Deutsch. Zeitschr. f. Nervenheilkunde, December, 1915.

places the cirrhosis is monolobular and occasionally signs of intralobular cirrhosis are present.

Pfeiffer[4] states that the ganglion cells of the cortex showed swelling, shrinkage and other types of cellular disease, limited mostly to the small and medium-sized pyramids. The alterations in the glia were characterized by enlargement of the nucleus and increased staining of the cytoplasm, and on the other hand a shrinkage with increase of chromatin granules. In the lenticular nucleus advanced stages of degeneration were found in the putamen. Practically all of the cells contained much fatty substance, and in many instances had almost vanished. The neuroglia tissue presented progressive and regressive changes. Macrophagic gliogenous cells were found, and within areas of softening large aggregations of fatty granular cells were discernible. Various products of disintegration were in evidence and the adventitial spaces of the capillaries distended. In general, however, *no abnormalities of the blood vessels were perceptible.*

The pathological alterations in pseudo-sclerosis resemble in many features those of Wilson's disease (v. Hosslin and Alzheimer[5]). In both marked gliogenous reactions are present. The process in progressive lenticular degeneration tends to terminate in softening in the lenticular nucleus, whereas in pseudo-sclerosis it does not. In the latter condition the process is more widely distributed, involving the optic thalamus, dentate nucleus and pons, at times the internal capsule, etc.

The following case is one of the amyostatic symptom complex resembling Wilson's disease. The patient was referred to me by Dr. William Shackleton, to whom I am indebted for the privilege of studying the case.

L. S., aged twenty-two, a fireman on a railroad, was admitted to Wesley Hospital complaining of a tremor. His family history was negative. He had a normal birth, infancy and childhood. He had used liquor in moderation; whiskey and wine, and had developed a taste for crème de menthe. Of previous illness he had measles, mumps, when a young child, scarlet fever at eleven, typhoid fever at twelve. At this time he was quite ill for six weeks. Three year ago he had rheumatism in his left shoulder. A soft chancre was contracted five years ago.

The present illness began two years ago, when the patient noticed a slight tremor of the right hand, which was increased upon voluntary movement. The tremor gradually spread to other parts of the body, involving all extremities, and gradually and progressively increased in severity until the present condition was reached.

[4] Pfeiffer, Jour. of Nerv. and Ment. Dis., April, 1917, Vol 45, No. 4, p. 289.

[5] v. Hosslin and Alzheimer, Zeit. f. d. ges. Neur., VIII, 1912.

When examined on April 8, 1916, he was found to possess a well-nourished, large bony frame, with good musculature. The skin and mucous membranes were negative. There was no adenopathy. His heart and lungs were negative. Because of his large size no diminution in liver dulness could be ascertained. The abdominal wall and contents were negative. The urine had a specific gravity of 1,010, contained a trace of albumin but no casts. He passed 1,200 c.c. in twenty-four hours. Examination of the blood showed 5,584,000 red cells per cubic millimeter; 5,800 leukocytes, of which 30 per cent. were lymphocytes, 60 per cent. polymorphonuclear neutrophiles, 8 per cent. mononuclear and transitional cells, and an occasional neutrophilic myelocyte. Hemoglobin was 90 per cent. The Wassermann reaction upon the blood was negative. Examination of the feces showed no abnormality except the presence of a moderate amount of fat. After the ingestion of 300 grams of glucose no sugar was found in the urine. After the ingestion of 400 grams .2 per cent. of sugar was found in the urine by means of the polariscope.

In the neurological examination the most prominent symptom was a tremor. The tremor was not constant, disappearing when the the patient was lying down, when in a position of rest, and when he was not under apparent observation. It appeared immediately upon any voluntary movement and increased in intensity upon sustained effort. It was coarse in nature, having 3.5 to 4 oscillations per second and consisted of movements of large amplitude, increasing in intensity, at times to become quite riotous. The movements were rhythmical alternations of contractions of antagonistic groups of muscles. The tremor was frequently induced by associated movements and emotional disturbances, and could be stopped temporarily upon passive change of position, and at times by voluntary change in position. Slapping the extremity in which the tremor was present did not stop it. The tremor was not marked in the beginning of voluntary motion, but with sustained effort progressively increased. The tremor of one hand could be diminished by holding the hand with the other. This procedure he employed in writing. A tracing of the tremor showed that an allorhythmic character similar to that found in paralysis agitans was present. When breathing deeply an increase of the tremor occurred with each respiratory movement. When observed lying in bed the legs were in continuous motion, internal and external rotation, adduction and abduction of the thigh constituting the movements. With slight flexion of the legs and the heels resting upon the bed there was seen a flexion and extension of the ankles and legs of both sides, and lateral movements of the feet. These movements resembled in a measure those elicited in a clonus. When at rest the arms frequently showed no movement; when the arm was held immobilized above the wrist rhythmical extension and flexion of the wrist was present. The hands were semi-flexed and showed a tremor suggestive of "pill rolling." If the arm was immobilized above the elbow, rhythmical flexion and extension, internal and external rotation of the forearm

occurred. On sustained shrugging of the shoulders, anterior and posterior and slight lateral rhythmical movements of the head appeared, becoming very marked upon bending the head backward. The lateral movements became more marked upon bending the head forward. Contraction and relaxation of the abdominal muscles coincident with the tremor of the thighs was observed. Upon standing, a continuous movement of the legs was observed, rhythmical flexion and extension of the toes, ankles and legs being present. The patient stood with one leg extended rigidly and abducted, and braced himself in this manner. Upon bending over there was marked rhythmical flexion and extension of the legs, which was transmitted to the trunk. Marked movements of the head appeared when he was standing. A lateral and at times a biting movement of the lower jaw appeared upon protruding it. Upon forced closure of the eyelids an irregularly rhythmical contracture of the orbicularis palpebrarum occurred. Upon protruding the tongue movements of the lower jaw became more marked. He walked with the trunk extended and rigid, head erect, and with a marked tremor. He flexed his thigh and extending the leg frequently brought it to the ground in an extended position. At other times he walked in a swinging strut, like a mechanical doll. The left side of the face had a somewhat washed-out expression. There was no spasticity, and no contractures were present. A generalized increase in muscle tone existed. Ocular movements showed no nystagmus. At times upon looking upward the movement was a bit jerky. Because of the constant tremors the deep reflexes seemed variable. One day, ankle-jerk, knee-jerk, triceps-jerk and jaw-jerk normal. Another day, ankle-jerk absent, knee-jerk normal, or right greater than left; wrist-jerk, right absent, left normal; biceps-jerk normal, triceps-jerk normal or right brisk, left normal; jaw-jerk absent. Again, ankle-jerk normal, knee-jerk normal, wrist-jerk equal and absent, biceps-jerk normal, or the left slightly greater than right, triceps-jerk brisk. The abdominal reflexes were brisk one day, another day not very brisk but equal, and another day the upper brisk, lower normal. The cremasters sluggish. The pupils were moderately dilated and reacted promptly and well to light and accommodation directly and consensually. The cilio-spinal reflexes were normal upon both sides.

Bladder, rectal and sexual functions were normal.

Sensation was normal as to touch, pain, pressure, heat and cold. Vibration, joint and muscle senses were normal. There was no ataxia; no dysmetria or adiadochokinesia.

The patient was irritable and fault finding; easily aroused to laughter and given to attempts to be witty, at times to a degree which would be comparable to "*Witzelsucht*." The facial expression was not peculiar in smiling. His speech was nasal; frequently he mouthed his words, considerable slurring was present and at times elision of syllables; the labio-linguals and lingno-dental sounds frequently were defective and slurred. Neither scanning nor explosive speech was observed.

Ophthalmoscopic examination was negative. The visual fields

were normal; no scotomata were present. The cranial nerves were normal. There was a distinct ring of olive-greenish pigmentation about the sclero-corneal junction.

Because of persistent but moderate abdominal pain in the right side of the abdomen the patient insisted upon an exploratory operation, and was operated upon on May 2, 1916.

At operation there was found an atrophic cirrhotic liver, and adhesions binding the gall-bladder down. The spleen was smooth, glistening and of normal size. The gall-bladder was opened and drained. On May 5, 1916, he died. He had developed a temperature of 102.2° F. the day following the operation; it rose to 102.8° F. in the afternoon, 105° F. the next morning, and before death reached 106.8 F. He became unconscious upon the day following the operation and was aroused only with difficulty. During the the state of unconsciousness all tremors ceased. His urine had a specific gravity of 1,025 and contained a large amount of albumin and a few hyalin casts.

The anatomic diagnosis, for which I am indebted to Professor Robert Zeit, was as follows: Eccentric hypertrophy of left ventricle; passive hyperemia and edema of both lungs; serofibrinous pleurisy right side; subpleural punctate hemorrhages; acute splenitis (Streptococci); acute hemorrhagic parenchymatous nephritis, with some chronic parenchymatous nephritis (moderate); fatty Laennec. cirrhosis of liver (marked hobnail liver) (Fig. 1).

The calvarium, cerebral and spinal meninges, the brain and spinal cord appeared normal macroscopically. After hardening in formaldehyde, coronal section of the hemispheres revealed a bilateral lenticular degeneration, extending from in front of the anterior commissure backward for a distance of about 1½ centimeters, and localized chiefly in the putamen. The left lenticula was more intensely affected than the right. The degenerated tissue had the appearance of soft, velvety sponginess (Fig. 2).

In the histological study the basal ganglia were examined in almost serial sections. Numerous pieces from various parts of the brain and spinal cord were examined by the following methods: Thionin, toluidin blue, Van Gieson, Heidenhain's iron hematoxylin, hematoxylin and eosin, Weigert's resorcin-fuchsin, Alzheimer's methods No. IV and V, Herxheimer, Weigert-Pal-Kulschitsky-Wolter's and Bielschowsky.

The changes in the nervous system not including the basal ganglia may be described as follows:

Microscopic Examination

1. *The Pia Mater.*—In general the pia mater showed but little pathological change. Occasionally there was found an area in which an infiltration of glia cells existed. Here and there were a number of Abraümzellen. No plasma cells were found. The blood vessels showed no change except over the frontal area where some of the vessels entering into the cortex from the pia were slightly thickened. In a deep cleft of a sulcus over the temporal region was found an

area in which the pia showed an infiltration which originated about a large blood vessel, of numerous glia cells, muscle cells, endothelial and adventitial cells and a few lymphocytes. Fatty and fibrinoid degenerative material could be found about this blood vessel as well as about some of the other vessels of the frontal lobe. The pia mater of the cerebellum showed a moderate thickening, with very slight infiltration with glia cells.

2. *Vessels.*—The capillaries in various parts of the cortex showed no change. The large blood vessels, especially in the white matter, showed a very moderate perivascular infiltration with few round cells and a number of glia cells, in a number of instances. About such a vessel granule cells and degenerative material were seen in small quantities. The perivascular infiltration with glia cells was more marked in the Rolandic area, where there was also found small round-celled infiltration about many of the blood vessels and in several areas large collections of round cells apparently lying free in the supporting tissue were seen. These probably had been carried over by the microtome knife. Where the infiltration existed in layers four or five cells deep a number of granule cells of various types were seen. The vessel changs in the frontal lobe were very moderate. This was also true of the paracentral convolutions. The vessels in the dentate nucleus and the hippocampal gyrus showed very moderate changes. The blood vessels in the spinal cord appeared normal. In no place was there found any thickening of the blood vessel walls.

3. *Neuroglia:* (*a*) *Fibers.*—There was a marked thickening of the glia fibers in the outer layer of the brain cortex, being most marked over the Rolandic area, the temporal lobe and the frontal lobe.

(*b*) *Cells.*—The glia nuclei in the third and fourth layers showed some degenerative changes in the form of being shrunken and assuming various abnormal shapes. The nuclei about the ganglion cells were chiefly a small, dark-staining variety with very poorly stained protoplasm in the cell. Many pigment granules were present within these cells. About the ganglion cells of the third and fourth layers particularly was found a moderate satellitosis. The nuclei of the outermost layer of the cortex were shrunken, distorted and pyknotic. Over the Rolandic area satellitosis was more marked. In the hippocampal gyrus a greater degree of satellitosis was found than anywhere outside of the basal ganglion. There was no satellitosis present about the Betz cells in the paracentral convolutions.

The *astrocytes* were not increased in number as a general rule. Where present they had very slender processes and marked clinging to blood vessels was but rarely found. Where this clinging was seen the insertion process was usually narrow, yet in some places rather broad filaments were found with widespread insertion feet. Occasionally an ameboid glia cell was found. No cystic degeneration of the astrocytes was observed. The glia fibers in the white matter frequently were short and granular.

4. *Nerve Cells.*—In general the ganglion cells showed well preserved bodies and processes. The changes were those due to direct

reaction. The cyto architecture of the cortex was only slightly disturbed and that most marked in the Rolandic area where the more than moderate satellitosis in the deeper layers made the cyto architecture less clear. The ganglion cells as a rule possessed large nuclei with poorly stained chromatin material. Frequently the differentiation between the nucleus and cell body was made out with difficulty. The cells which were surrounded by satellites showed no greater degree of degeneration than the other cells. The small pyramidal cells showed the greatest change. They were usually poorly and diffusely stained, not showing any clearly marked Nissl bodies, some with an apparently normal nucleus and others in which the nucleus was very poorly stained. The small shrunken and distorted, dark-staining cells were but rarely seen, and the changes corresponded to the descriptions of those cells undergoing simple chromatolysis. The Betz cells were well stained as a rule; some showed a moderate degree of chromatolysis, the Nissl granules appearing in small, diffusely staining, dark, reticular formed masses throughout the cell body. This was most marked in the paracentral convolutions. A moderate amount of fatty pigment was found particularly within the small cells of the frontal, temporal and occipital lobes. This was in no way comparable to the fatty changes observed in the senium or accompanying arteriosclerotic processes.

The neurofibrillæ of the Betz cells showed some deviation from normal. They stained poorly and were distributed in a granular network about the nucleus or towards one or another dendrite of the cell. In the processes where they were well conserved, the fibers were readily made out and well stained. The large pyramidal cells showed well-preserved processes, but the fibrillæ were faintly stained. The small pyramidal cells showed either a very light granular stain or numerous dark granules scattered throughout the cells. Frequently there was seen in a small pyramidal cell granular gobs of fibrillary tissue.

Fatty Degenerative Products.—In the cerebral cortex fatty degenerative products were found scattered to a slight degree about the vessels of the pia mater, here and there along larger blood vessels throughout the brain tissue, and included within ganglion cells and occasionally glia nuclei.

The *cerebellum* showed tissue in a much better state of preservation than in other parts of the brain. The Purkinje cells showed normal processes, but many had lost their Nissl granules. The cells of the dentate nucleus were well preserved. The nucleus was centrally located, but the cell bodies stained very faintly, for the most part without any differentiation of the Nissl bodies. The cellular changes here were distinctly different from other portions of the brain, inasmuch as here the nucleus was very much more prominently stained than the body, which was quite pale. No satellitosis was present. A considerable amount of fat was present within the cell bodies.

Despite the great degree of satellitosis about the ganglion cells in the hippocampal gyrus, the chromatin material within the cells could be made out distinctly.

The Pons.—Slight reduplication of the ependyma of the fourth ventricle was present. A slight degree of satellitosis existed. In certain areas there was found about the blood vessels and degenerated ganglion cells collections of numerous small and large globules of basophilic nature, apparently hyalin or colloid material. These were found chiefly deep in the floor of the fourth ventricle to the sides of the median raphe. They were scattered in considerable profusion in this area, appearing about all the capillaries, and when found about a ganglion cell it was noted that the cell was near a blood vessel. These bodies were found about the vessel walls and were not included within the lumen of the vessel. With few exceptions the ganglion cells which lie in this area stained well and showed normal processes and nuclei. The glia nuclei stained poorly. The vessels about which were deposited these bodies showed no changes

Fig. 1. Cirrhotic Liver.

differing from the blood vessels elsewhere in the pons. Many of the ganglion cells showed their nuclei to be displaced to the edge by masses of fat pigment, but the Nissl granules stained well throughout the pons.

The Midbrain.—Considerable reduplication of the ependyma was found about the floor of the aqueduct. The substantia nigra stained well. The cells of the nuclei within the midbrain were in general fairly well preserved; occasionally some degree of chromatolysis could be made out. A considerable degree of pigment was present in the cells, displacing the nucleus laterally so that with low magnification they seemed to be examples of axonal reaction. A few cells, moreover, actually showed great similarity to this reaction.

The *spinal cord* showed very little change. Some of the cells in Clarke's column showed a loss of nucleus, but stained normally

otherwise. A moderate amount of fatty pigment existed in the cells.

The *sympathetic* and *spinal ganglia* were normal.

Basal Ganglia.—Through the degenerated portion of the lenticular nucleus, principally in the putamen, sections which had been fixed and hardened showed an appearance of a marked *état criblé.* When this same area was stained without hardening, as in a frozen section, this condition was not observed. It would appear that this spongy, reticulated appearance, with large vacuolated areas was due to an artefact which was the result of the hardening process.

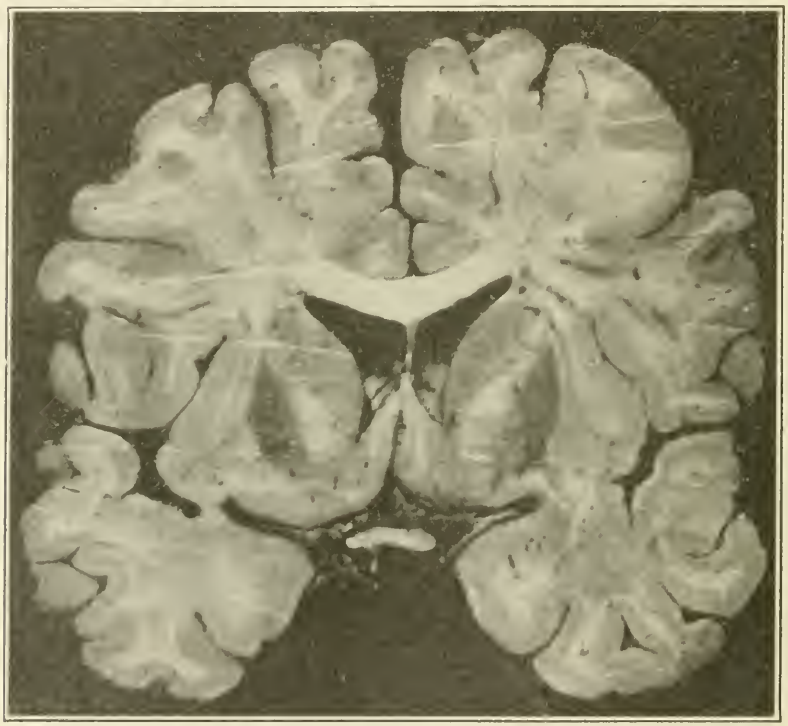

Fig. 2. Gross Appearance of Lenticular Degeneration.

No characteristic alterations have been described in the degenerated areas of the lenticular nuclei of cases of progressive lenticular degeneration. Pfeiffer distinctly stated that there was no evidence of inflammation or pathologic vascular alterations in his case. The vascular changes appearing in sections impregnated with silver were so marked that a description of such a section will probably afford a clearer insight into the picture of this type of degeneration than a study of the various elements.

With a more or less sharply outlined border there is an area wherein a marked thinning process has occurred. Here there is

seen a disappearance of most ganglion cells with the presence of a large number of glia nuclei, granular cells and debris. The most striking picture, however, is formed by the blood vessels, which appear in the form of a dense network of thickened, tortuous, gnarled, twisted, knotted, wavy and split-up vessels. The capillaries which usually were barely perceptible with this stain here appear as widened bands, usually quite devoid of blood within their lumen. Small curled and curving processes connect one capillary with another so that a veritable maze is formed. The large blood vessels show a thickening of the wall with many fibers curling about the lumen. Frequently in one area there is seen a vessel which is cut

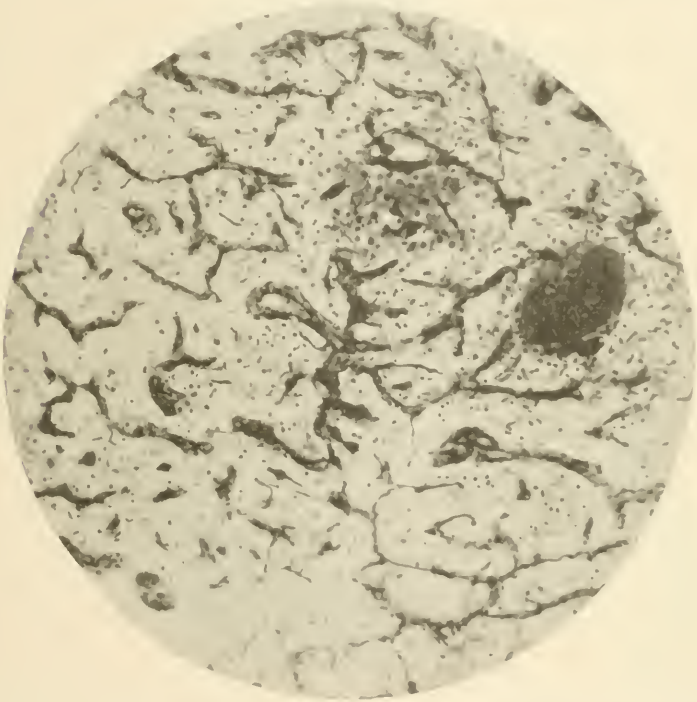

Fig. 3. Vessel Changes in Degenerated Area as Shown by Silver Impregnation. (× 145.)

four or five times in various transverse and longitudinal diameters. Often definite twists about its own axis are seen. In many places such large vessels have fallen out of the perivascular space (Fig. 3). On high power these vessels show only indistinctly the remnants of their old lumen, about which may be seen numerous fibers and processes curling over nuclei. Traced inwards from normal tissue, the change from the normal capillary to one in which the outline of the wall is very markedly accentuated is very abrupt. In places the fibers are matted about a vessel so as to appear like a shredded

rope (Figs. 4, 5 and 6). In many areas, the junction of the capillaries, one to the other, gives the picture an appearance of being divided into lobules. Along the course of these vessels are found glia nuclei and a large amount of degenerative material in masses of collections of small globules, and granule cells containing heaps of such material. Traversing the entire area are numerous fibers. Between the vessels are found degenerated ganglion cells and, in many places, apparently normal cells. Here no marked perivascular infiltration is seen. In areas where apparently the greatest degeneration has taken place, the vessels appear upon a background consist-

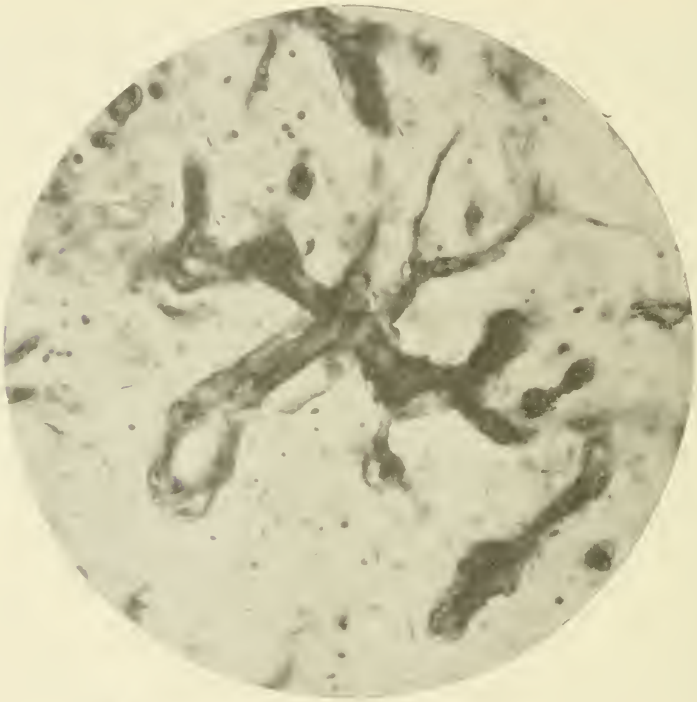

Fig. 4. High Magnification of Part of Fig. 3 (× 350), Showing Glia Fibers and Sclerotic Degeneration of Adventitia.

ing chiefly of glia nuclei presenting the appearance of a frosted window. Here the fibers, although more numerous, seem to be of a much finer quality. Here and there on high power may be picked out ganglion cells or their nuclei. The glia nuclei show two varieties—one stained very dark, the other a light brown. The tissue in the markedly degenerated areas is studded with a large number of intensely black granules and masses, many of which seem to be the direct result of the degeneration of glia and vessel nuclei. The tissue surrounding this region shows many areas filled with degenerative processes, but in contrast to this region shows nerve fibers of normal

appearance. In places where the knife has apparently dragged, the vessels are torn out, breaking up large areas of tissue, as if capillaries which normally had no connection were in some way bound one to the other.

The appearance of this area when stained with hematoxylin and eosin furnishes a surprising contrast. Here the vessel walls are not at all inordinately thickened. The intima, with Weigert's elastic tissue stain, shows no thickening or reduplication. The medial coats of the vessels seem to be somewhat enlarged. The capillaries appear very indistinctly in the degenerated area. About the large vessels a moderate amount of infiltration is present. It consists chiefly of glia nuclei and degenerative material. The vessel wall is infiltrated with adventitial and muscle cells. A few round cells are present about the vessel which may be small glia nuclei. At the edges of the degenerated area the capillaries are surrounded by small globules of hyalin-like material. This even in the presence about

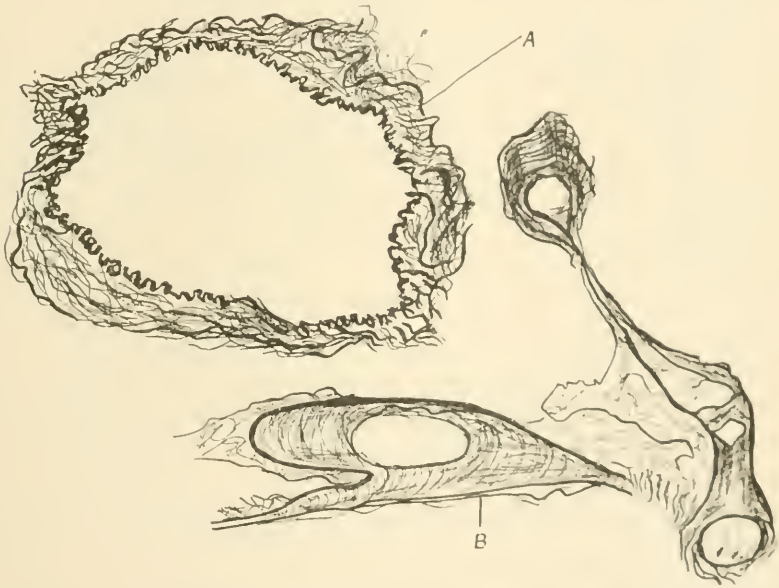

Fig. 5. Semidiagrammatic Drawing of Vessel Changes in Degenerated Area Shown by Silver Impregnation. *a*, sclerotic degeneration of adventitia; *b*, large vessel cut in a number of transverse and longitudinal diameters because of tortuosity.

them of seemingly normal tissue. Such collections of hyalin material are found in the tissue of the external capsule and increase as we approach the markedly degenerated area, where along the course of the blood vessels and capillaries this substance is distributed in large quantities, appearing in every way similar to the masses described in the pons.

Upon looking at a horizontal section including the entire area of

the basal ganglia, there is noted an abundance of globules of hyalin or colloid-like material distributed chiefly about the blood vessels and along their course. This area is in a measure demarcated rather sharply from the tissue in which these bodies are not found. It includes that area which is bounded by the limbs of the internal capsule and the external capsule. A greater amount of this material is found in the putamen than in the globus pallidus. On high magnification this material is present in globules varying in size from hardly visible dots smaller than a micrococcus, to gobs the size of a large myelocyte. Usually they are discrete, but in many places confluent, and here appear as irregular masses. Occasionally is found

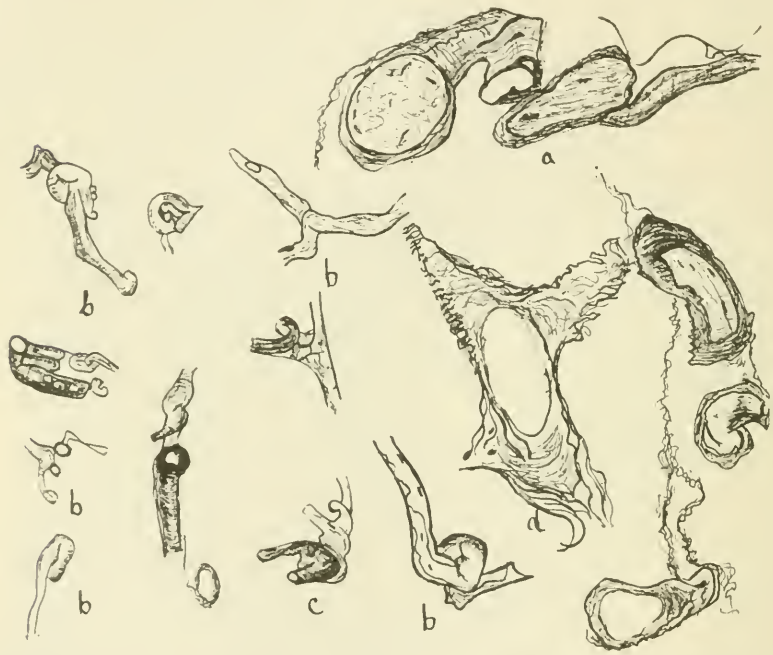

Fig. 6. Same as Fig. 5. *a*, same as "*b*," Fig. 5; *b*, whorled, knotted, twisted, gnarled and thickened capillaries; *c*, twisted capillary surrounded by glia cells; *d*, sclerotic degeneration of adventitia; vessels connected by sclerotic processes.

a mass in the shape of a letter "L" or a sausage. It is notable that the blood vessels which are surrounded by these bodies are often devoid of red blood cells, although in tissue lying close by where the blood vessels appear normal, red blood cells are plainly seen. These blood vessels course through tissue which does not show any great degenerative changes as ordinarily understood. It is true that the ganglion cells are diffusely stained; that frequently the nucleus is not well differentiated, and that fatty inclusions are large; on the other hand, neuronophagy is rare and where present is not excessive. At the same time it cannot be said that any thrombosis has occurred in

any of the vessels, because there is no perivascular infiltration nor intense degeneration about the vessels. Fatty products are found in great profusion scattered throughout this area. They appear in the shape of small and large, discrete and confluent masses of fatty tissue, some lying free and others included within glia cells and within granular cells. Although the quantity of fatty tissue is very extensive, yet as compared to the brain of a senile dementia the blood vessels show a comparative sparseness of perivascular fatty degeneration as compared to the entire quantity of fatty material (Fig. 7). The discrepancy between the appearance of a silver-stained specimen and those stained by other methods is made clear by the employment of Alzheimer's glia stain, whereby it can be seen that the apparent thickening of the vessel walls in the degenerated area

Fig. 7. Glia Bodies Surrounding Blood Vessels and Glia Fibers Clinging to Vessels by Insertion Processes. *G*, glia; *V*, vessel walls.

is due to two factors: first, to a sclerotic degeneration of the adventitia and, second, to marked proliferation of glia processes which send their insertion feet in every direction toward the vessel wall. Along the capillaries they may be seen to range themselves in large numbers, to engulf them and bind them one to the other. Many ameboid glia cells are seen and the spider cells in most instances have undergone granular degeneration. These processes send enormously sized communicating feet to the vessels and to each other, so it can be readily seen that these processes may with a silver stain appear, when joined to vessels, as vessel walls themselves. A few of these spider cells show some cystic degeneration as well as gran-

ular, but for the most part the protoplasm and nucleus stain well. So dense is the network of fibers that it is only with great difficulty that their true relation to the blood vessel can be made out.

Fibers.—The lenticular nucleus showed marked atrophy and was flattened so that the internal capsule appeared large in proportion. The putamen, within whose confines was located the greatest degree of degeneration, was much more atrophied than the globus

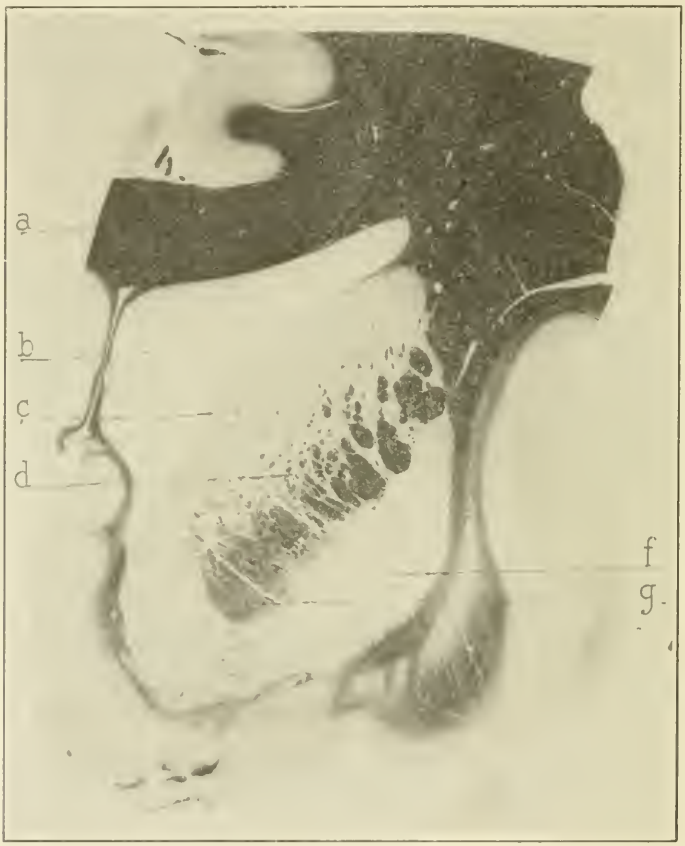

FIG. 8. Coronal Section through Basal Ganglia in Front of Anterior Commissure (Weigert). *a*, corpus callosum; *b*, lateral ventricle; *c*, caudate nucleus; *d*, internal capsule showing few degenerated fibers, especially near the globus pallidus; *f*, lenticular nucleus, showing degenerated internuncial fibers; *g*, globus pallidus.

pallidus. The medial lamina of the lenticular nucleus showed degeneration. Numerous fibers in the anterior limb of the internal capsule near the globus pallidus, were found to be degenerated. These fibers apparently consisted of those passing from the globus pallidus to the caudate nucleus and from the basal ganglia to the

cortex. Although it has been assumed that the internal capsule must be intact from end to end in cases of pure Wilson's disease, it is difficult to understand why degeneration of these fibers should rule out an extrapyramidal disease. The pyramidal tract was intact from end to end. There was moderate degeneration of the

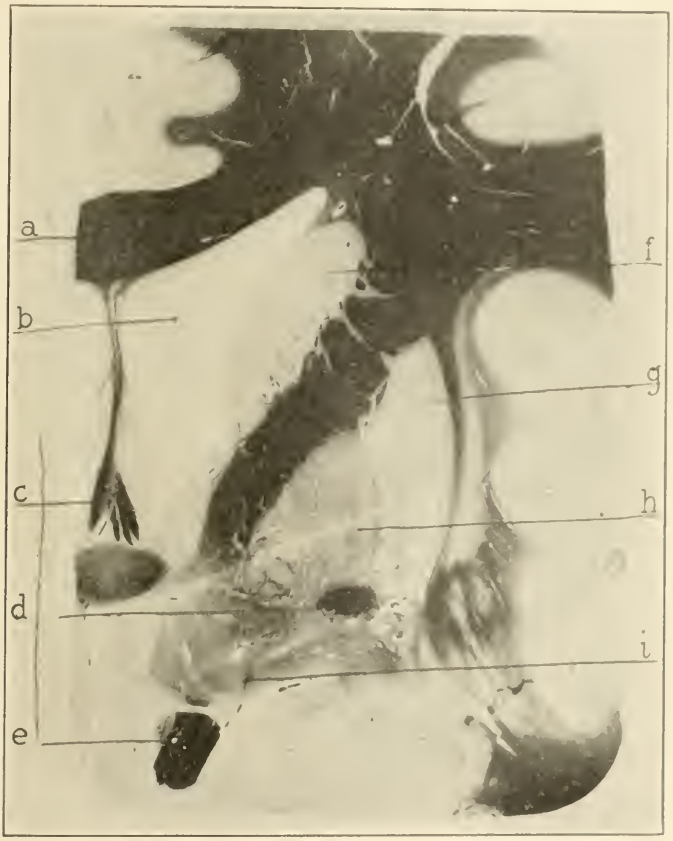

Fig. 9. Coronal Section through Basal Ganglia at Posterior Extremity of Anterior Commissure. *a*, corpus callosum; *b*, lateral ventricle; *c*, fornix; *d*, anterior commissure; *e*, optic nerve; *f*, caudate nucleus; *g*, putamen of lenticular nucleus showing marked atrophy, degeneration of internuncial fibers and of medial lamina; *h*, globus pallidus; *i*, ansa lenticularis moderately degenerated.

ansa lenticularis. The corpus Luysii showed moderate atrophy. The lenticular striæ of Forel and Forel's bundle showed moderate degeneration. The internuncial fibers were degenerated (Figs. 8 and 9.)

The thalamus, midbrain, pons, medulla and spinal cord were free from degeneration.

The presence of degenerative material staining with basic stains has been noted by all observers in progressive lenticular degeneration, and has likewise been found in pseudosclerosis. Auer and McCouch[6] have noted their presence in the basal ganglia of two cases of paralysis agitans, and Hunt[7] describes them in his case of Juvenile Parkinson's Disease, which he classifies as Progressive Atrophy of the Globus Pallidus. Pfeiffer noted them in his case of progressive lenticular degeneration. The origin of these bodies has been much discussed. According to the older views they represent degenerated axis cylinders or myelin sheaths (Siegert, Wolf and others) or glia cells (Obersteiner, Redlich and others). Obersteiner suggests that they are degenerative products occurring within the glia cell body which are at first surrounded by a layer of fat, and that when the cell undergoes disintegration these bodies are set free and the fatty envelope is dissolved. Recently, Alzheimer has suggested that they do not exist in the solid form during life, but are the result of precipitation of certain material from the tissue juices by the fixing fluids. Their meaning is not by any means clear, but they occur especially in chronic degenerative conditions such as the senium, etc. Their constant appearance in diseases of the basal ganglia suggests that they are more significant than has been supposed.

It seems highly probable that these degenerative masses occur as the result of the precipitation of some substance which is fluid during life. In areas where the blood content of the blood vessels is stained sharply, we frequently see a considerable area of the lumen of the blood vessel filled with an oblong mass of substance taking the same stain as the usual small, square masses of blood take. Inasmuch as the vessels about which degenerative material appears show no inclusion of such square cut masses, it is reasonable to assume that they either were absent when the tissue was put in the fixing fluid, or have found their way outside of the vessel and were either broken down or fixed as they were. It is my opinion that the hyalin or colloid-like masses which were found about the blood vessels and which occur in large-sized globules are the result of blood which has passed through the blood vessel wall, and as a result of fixation assumed this type. Of course the small, dot-like masses which occur not only about the blood vessels but usually within the vessel wall and never outside of the perivascular space have a different origin. If we assume that these masses are of hematogenous origin,

[6] Auer and McCouch, Jour. of Nerv. and Ment. Dis., June, 1916.
[7] Hunt, Proc. Amer. Neur. Soc., 1916.

the change must have occurred post mortem. If this is true, then it may be assumed that the vessel walls in such areas show a greater permeability to the substances contained within them than elsewhere. I have observed on a number of occasions in a series of specimens in cases of pellagra thrombi-like collections of such material within the blood vessels, and these thrombi branched into the small branches of the blood vessel. Yet about such vessels there was no evidence of perivascular infiltration or degeneration as would have occurred with a thrombus occurring intra vitam. The vessels themselves show only the sclerotic degeneration of the adventitia and a dearth of muscle adventitial and endothelial cells.

Cerletti[8] calls attention to the association of hyalin changes with sclerotic degeneration of the adventitia in which not only are there masses of hyalin-like substance about the vessels, but the adventitia itself shows hyalin change. This hyalin-sclerotic degeneration of the adventitia cannot be ruled out in this case, but it would seem that the presence of hyalin bodies is due to another factor.

The changes observed in this case of progressive lenticular degeneration may be said to consist of local and general reactions. The general reactions include such cell and glia changes as may be attributed to direct, acute, and chronic types of reaction. Although diffusely found and widely scattered, these changes are moderate in their intensity. The condition causing the patient's death, attended as it was with sepsis and hyperthermia, must have played no small rôle in producing many of these changes. It certainly could have caused the perivascular infiltration, the small round cells, and many of the changes in the pyramidal cells, and the satellitosis. The chronic changes, which were widely scattered, were distinctly overshadowed by those which were localized in the lenticular nucleus.

The degeneration of the lenticular nucleus showed no evidence of an inflammatory reaction. The very prominent vessel changes in areas where the degeneration had not proceeded to disintegration indicated that these changes were at least a part of the general effect of the agent producing the degeneration, and were not consequent to the disintegration. Where the disintegration was greatest the blood vessels, reinforced by glia fibers, showed the greatest resistance to the destructive process. The intense gliosis seemed to have been built up upon a ground work of pathological blood vessels.

[8] Cerletti, Histologische u. Histopathologische Arbeiten, Vol. 3, 1911, p. 1.

As Cerletti[9] has pointed out, the gnarled, twisted, knotted and curved vessels occur wherever an atrophic process is present, as in paresis, foci in senile dementia, abiotrophy, etc. This is probably the explanation for their appearance in this case, where there was a marked atrophy in the degenerated area. The wavy curving of vessels is associated with thickening of the adventitia and here was due to sclerotic degeneration of the adventitia.

In the absence of inflammatory changes and evidence of reactions due to toxic changes, the vessel changes in this case point to the existence of a process superimposed upon a faulty development of the nervous system.

[9] Loc. cit.

PSYCHOSES ASSOCIATED WITH DIABETES MELLITUS*

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As with a number of other general disturbances of bodily metabolism, so with diabetes mellitus there has at various times been considerable discussion as to the association with some more or less characteristic mental disorder. No very definite conclusions have been reached and this of itself would tend to suggest the absence of any specific picture. The feature which has been most emphasized as of frequent occurrence is that of a more or less severe anxious agitation. This may be due to the more frequent appearance of diabetes during the involutional period of life when, as is well known, such mental upsets are also common. On the other hand it has been suggested that in some cases glycosuria is an expression of the general disturbance of metabolism which forms part of a state of anxious depression and some facts have been collected to establish that in severe depressions there is an increase of glucose in the blood.

We do not propose to go into the literature of this interesting topic but will merely state that as far as we have found in the recent text books there is no reference to the occurrence of pictures which *a priori* might be expected. The type of reaction common to brain intoxication of all kinds is that of the so-called toxic hallucinosis which may or may not be associated with clouding of consciousness. Necessarily the manner in which the patient reacts to these sense falsifications, the conclusions he reaches concerning them and the steps he takes to meet such experiences will depend upon the individual's habits of reaction. In this way there may be brought about a great variety of surface appearances (often called different kinds of insanity) having as a fundamental basis the occurrence of sense falsifications which seem intelligible as the direct result of interference with nerve-cell function.

In diabetes there is a more or less severe disturbance of general metabolism with evidences of altered function in many organs. It

* Read at the meeting of the American Neurological Association, May 21, 22 and 23, 1917.

might therefore be anticipated that some examples would present evidence of toxic brain disturbance. Such are certainly rare in our experience and it has therefore seemed worth while to report briefly two cases in which manifestations possible of inclusion in this category have been observed.

In so doing we may call attention to the entirely unexpected observation which was not recognized until charts were made after it was too late to go more into detail, that the periods of acute toxic symptoms have coincided with diminution in the amount of sugar in the urine. We do not offer this as a generally applicable rule nor do we feel justified in offering any explanation. It may be noted, however, that in the first case in which the reduction in the amount of sugar appeared spontaneously there were evidences in the appearance of albumen and casts of some exacerbation of parenchymatous change in the kidney. Estimations of blood sugar and alkali reserve were certainly indicated but unfortunately were not carried out.

The relationship with reduced sugar in the second case is not so clear cut and was noted only in connection with therapeutic efforts. The prolonged character of the hallucinosis and the peculiar reactions of the patient also render the toxic character less clear. It is possible that the objections on the part of the patient to the severe diet restriction at the beginning of the treatment may have given rise to excitement as the result of resentment and that a temporary acidosis may have appeared.

The last feature is, however, incidental to the observation and our main object is to record the appearance of toxic hallucinosis in connection with diabetes and to suggest that in all probability some of the so-called anxious depressions in the literature may have been really of this type.

Case I. M. G., a white woman concerning whose history there is not much information to be obtained. She was born in Ireland about 1880 and, her mother dying when the patient was 4 years old, had few advantages and much hardship during childhood. She came to America in 1892 and started work as a domestic.

She married in 1900 but was deserted by her husband 4 years later. There was one miscarriage and one child which died in infancy. Following the separation she worked as a domestic and waitress in restaurants, evidently making but a poor success although she worked steadily. In 1907 she met a negro with whom she has since lived as a common-law wife. There have been no further pregnancies.

For a number of years she was in the habit of taking about two glasses of beer daily, but denies that she drank whiskey or became intoxicated. She has also chewed tobacco.

Health was uniformly good until about 1907, since when she has had occasional spells of nervousness with some apprehension accompanied by pain in the epigastrium. These have usually lasted only a day or two and gave rise to no suspicion of definite mental disturbance. The attacks usually occurred in the summer time about once a year, but she did not have one in the summer of 1914. In November, 1914, there developed a severe pain in the lower part of the chest and in the lumbar and sacral regions of the back which was exaggerated by movement. This lasted through December, but was evidently not very severe.

On December 28, 1914, she began to become apprehensive and complained of pains in the head and back. She stated that these were due to people throwing something onto her, "seemed like water sprinkled on my head." Sparks and lights appeared before her eyes and she heard remarks such as "we are going to get her." She stated later that, even during this acute hallucinatory period, she realized her surroundings but was very much scared. She slept for a while during the night and upon waking felt somewhat better but still apprehensive. She went out with the purpose of seeking help from a friend but became terribly frightened, was "followed by a large crowd" and went home. For the next two days she was pestered so by people following her, throwing things on her through the cracks of the door and thus causing her such intense suffering that she hardly knew what she was doing. She therefore went to the police station for assistance and protection. Thence she was sent to the Psychopathic Hospital.

There she was very much alarmed and very restless. When placed in a continuous tub she screamed and fought and spoke about a dead man in the bath. The various sights and sounds around frightened her and she anticipated some danger.

The restless apprehension with sense falsification led the hospital physicians to conclude that she was suffering from a toxic hallucinosis, probably alcoholic. She was sent to Kankakee on January 8, 1915.

When received she was quiet but mildly fearful and was suspicious of anything that was done for her, begging every now and then "Don't kill me," "Let me live as long as the Lord will let me." She heard the people on the ward make remarks about her in which "they wished she would go to jail or to the penitentiary because she had been living with a colored man." Otherwise she was clear and well oriented. The examination of the bodily organs revealed the presence of glucose but no albumen or casts in the urine. She weighed 135 lbs., was well nourished and no evidence of other disease was detected. The Wassermann reaction was negative both in blood and spinal fluid and no other changes were found in the latter.

Examined at a later date by the Binet-Simon tests it was found that she graded at a mental age of 8½ years.

All apprehension disappeared in a few days and she became a quiet steady worker with full interest in her surroundings and in her recovery. During the next 6 months there was no further

mental disturbance although urinalyses showed the constant presence of sugar to the amount of from 2 to 4 per cent. with a quantity varying between 1,000 and 1,300 c.c. The body weight remained constant between 130 and 135 lbs.

In July and August the body weight gradually fell 6 lbs. and the amount of sugar became less, ranging between 1 and 2 per cent. though no rigid diet had been prescribed. As she had seemed so well she was, on August 31, allowed to return to Chicago under the supervision of the Mental Hygiene Society.

She worked well the first day but upon the following night became fearful and began to hallucinate saying "fire and electricity" were being "forced through her body," complained of numbness and burning and also heard a hammering on the wall. She speedily became very excited and tried to escape with the consequence that she was returned to the Psychopathic Hospital and from there to Kankakee.

When received she had become quieter but was still apprehensive and spoke of smelling "drugs and horse manure." At times she reacted as if very much frightened and spoke of voices, both threatening and calumniating. Sometimes she admitted these were thoughts, at others she had no such insight. Numerous unpleasant bodily sensations were also complained of.

The urine was examined repeatedly after re-admission and while the first specimen contained 2 per cent. sugar this disappeared altogether for the next few days. The chart illustrates the condition better than words but it is worth noting that albuminuria and once hyaline and granular casts were present at this time.

The acute mental disturbance subsided rapidly with the reappearance of sugar in the urine although there were some oscillations in the two manifestations, generally in an inverse relation to one another. These are shown in the chart and need no further description.

Subsequent to the period covered by the chart the patient has continued irritable and suspicious, complaining about other patients and about her detention in the hospital but there has been no further period of hallucinosis. There is no definite paranoic development but she does little work and is difficult to get along with. Sugar continues to be present in the urine. She refuses to permit any further study of the urine or prescription of diet and it has been deemed wiser to attempt no coercion.

I regret that no estimations of the alkalinity of the blood were made during the acute period. Estimations of the amount of acetone in the urine were made at the end of the period covered by the chart and showed no excess nor was any diacetic acid found.

In reading the line in the chart representing the mental condition the level 5 indicates a condition of severe apprehension and hallucinosis; 4 or 3 represents less degrees of this state. 2 corresponds with irritability and occasional slight apprehension without hallucinosis, the chief feature being irritability and failure to work. The level 1 expresses a quieter state with some capacity

for work. 0 would correspond with the patient's usual pleasant attitude and steady occupation.

For the sugar curve the figures 1 to 5 represent percentages of sugar. This has been employed for the reason that complete 24 hour specimens were not always obtained. The daily amounts of urine were between 1,000 and 1,500 c.c.

Case 2. A. F. C., a white woman. The father drank to excess and developed mental disorder at about 58 years which persisted until his death at 64. The mother recently died at 70 years but had been childish since the age of 66. There are three healthy sisters.

The patient was born in 1870 in New York, was healthy except for occasional headaches and an attack of chorea which lasted one year at the age of 6. She attended a Catholic school until 14 years old. She was "intelligent" but did not make rapid progress because she "would not" apply herself. She worked as a domestic

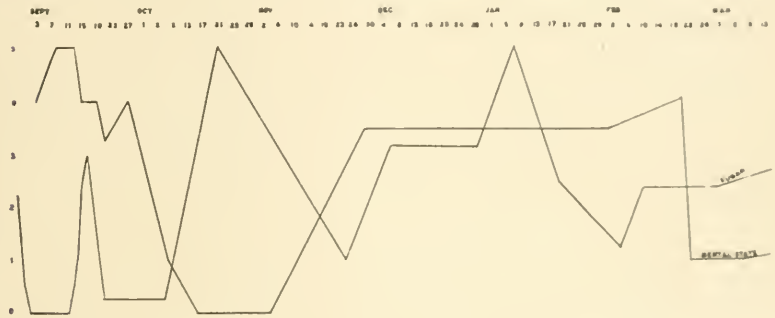

Fig. 1.—Chart showing the oscillations in amount of sugar and mental disturbance in Case 1.

after leaving school but changed employers frequently and did not remain longer than two years in any one position. The reason assigned by a sister was that the patient was not willing to work hard.

Puberty occurred at 14 years. The periods were regular but painful. She was married in 1902 at 32 years. She had two miscarriages but no completed pregnancies. The menopause occurred at 39 years, the last period being in February, 1909.

The patient is described as "flighty" and "giddy" as a child. As an adult she was generous but cranky and easily angered and she quarreled a great deal with others. She was prone to think she was "more important" than was justified by her position and is said to have been a "terrible liar." There is some evidence that she used alcohol to excess though details are lacking. It was stated that she would drink straight whiskey and occasionally went on a debauch.

The mental disorder began abruptly in May, 1911. While on a street car she suddenly heard voices say vulgar and threatening things to her and looked about to see who was talking. These hallucinations persisted and with many uncomfortable bodily sensa-

tions were explained by saying people hypnotized her and sent "electricity" through wires which were attached to her. She felt "pinpricks" over the body. During the year following the onset she was greatly troubled and tried to discover her persecutors. Finally she concluded that these were a certain man aided by others and she complained to the police and to the federal authorities. There was some apprehension but this was not marked and the reactions mentioned led to her commitment.

The patient was admitted to Kankakee, July 26, 1912, at 42 years of age. The face was reddened and plethoric and she was quite obese, her height being 5 feet 2 inches and weight 190 pounds. She complained of occasional "hot flashes" and of vertigo. A single specimen of urine examined at this time did not show sugar. The specific gravity was 1.018.

The neurological examination gave no definite findings. There was slight swaying in the Romberg position and the knee jerks were obtained only with difficulty. Tremor of fingers, tongue and eyelids was noted.

The patient was correctly oriented and memory for recent and remote events was good. She talked freely about the persecution she had suffered, complained of a cutting sensation about the umbilicus and said that her scalp, the entire head and other parts of the body were "pulled" and that the toes "cramped." She heard the voices of a man and of a woman. These were tormenting and taunting and audibly repeated her thoughts. She said that on different occasions at night she had seen a room full of ragged people, a dance and beautiful flowers. These last appear to have been of the nature of dreams and led to no reaction.

The explanation given by the patient for the sense falsifications was that the man already mentioned had charge of a house of ill-fame and that through such unusual means as "mesmerism," "X-Ray," "ventriloquism," "inoculation," etc., he made her suffer in order that he might amuse those who frequented his establishment. These terms appear to be merely expressions of the unintelligible nature of the sense experiences and to have no special meaning for the patient as they are not persistent and are culled from things heard or read.

She was pleasant toward others and showed no evidences of distress except while talking of the persecutions she had suffered. Then tears were visible but the attitude was much more one of vigorous protestation than of depression. The speech was forceful, circumstantial and rapid.

Throughout the period, something less than five years, which has elapsed since admission to the hospital this patient has shown no evidence of sidetracking of interest or oddities of behavior. The sense falsifications have remained the most prominent feature of the mental picture and the reaction to them has been adequate. She has been vindictive toward her persecutors and indignant that nothing was done to apprehend them. She has written not only to relatives but to many municipal, state and federal authorities as well as

to her enemies. There have been decided periods of quiescence and exacerbation and it has once been possible to send her home. She takes a keen interest in others on the ward and in her own immediate needs and she works well for the most part. There has also been no attempt to work up the explanations into a definite system beyond the facts given.

The absence of sugar in the single specimen of urine examined upon admission and of other clinical manifestations of diabetes mellitus resulted in a failure to reëxamine the urine until in October, 1912, when she was found to be suffering from a dermatitis of perineum and thighs. A 24-hour specimen obtained then contained 69.75 grams of glucose. Since that time sugar has been present in increasing amounts. In 1916 and 1917 she occasionally passed as much as 318.09 grams sugar in 24 hours (4,455 c.c. urine). Thirst and appetite have not at any time been excessive.

The patient was placed upon a restricted carbohydrate diet but the urine continued to contain sugar in amounts generally between 50 and 100 grams daily. Although the patient remarked that the spirits bothered her less at night after the restricted diet was ordered no obvious change in the mental picture was noted. The gradual increase in the amount of sugar found in the urine has not been accompanied by any demonstrable change in attitude.

In October, 1916, on account of some loss of weight and the increase of sugar a more definite attempt was made to control the condition and the ordinary ward diet was rapidly restricted according to the method of Allen as described by Joslin. At the end of a week the patient was receiving only clear beef broth, coffee, tea and water and the sugar content of the urine dropped from 202.5 grams in the 24 hours to 8.75 grams, being then negative to the Benedict test. With the decrease in sugar the complaints of "electricity" and of "the voices" became much more marked. She became more restless and irritable and talked angrily about her persecutors. The expression was one of acute distress. Carbohydrates were added gradually during the next two weeks with a slight rise in the sugar of the urine. She believed so strongly that the treatment made her worse and complained so much of the bodily sense falsifications that finally she obtained food surreptitiously from other patients despite all precautions and refused to save the urine. The lack of coöperation and the increasing excitement necessitated an abandonment of the treatment four weeks after it was instituted. With the increase in diet she rapidly improved and after three or four days was quite good natured and quiet in behavior. She not only resumed the ordinary tasks which she had been accustomed to do before the dietetic treatment began but even assisted on occasion with some reëducative work which was being done on the ward.

In February, 1917, a further attempt to reduce the sugar by diet was instituted as the patient was losing weight but she at once complained bitterly of the restrictions and of the persecution. Owing to a misunderstanding in orders the treatment was discontinued after two days. No change in the urinary findings occurred at this time.

In March the treatment was again instituted with the same general result as that described as occurring in October, 1916. She demurred as soon as the diet was restricted and a few days later became decidedly belligerent. Her distress increased as the sugar decreased in amount and she returned to a state of average comfort within a few days after full diet was allowed. Catamnestic accounts of the experiences during the more or less sugar free periods confirmed the conclusions as to distress and increased hallucinosis, including both somatic and auditory sense falsification, based upon observations by others.

THE RATIONAL USE OF LUMBAR PUNCTURE AND INTERPRETATION OF FINDINGS*

By James B. Ayer, M.D.

My excuse for presenting a paper on a somewhat time-worn subject may be found in the experience of a patient of Dr. Paul's. A man of 60 with well-marked symptoms of tabes of some twenty years' duration was advised by him to have salvarsan to relieve his pains. Before doing so the patient consulted among others two well-known New York neurologists. One said "first have an examination of the spinal fluid"; the other, "don't let anyone tap your spinal canal; all they want it for is a matter of record." Thus the disagreement of experts within this very society. In my opinion, in this particular patient, with old degenerative tabes, the latter view is the correct one, for in his case the diagnosis was not in question, and the treatment was to be the same whatever the spinal fluid showed, namely, salvarsan for the one symptom pain. Had the patient been a man of 30 or the symptoms and signs conflicting, this decision is wrong, for then we need this examination in order to make a finer diagnosis and prognosis, or as guide to treatment.

This leads to the question, when shall we examine the spinal fluid? In any case in which we need corroborative evidence for diagnosis, or more evidence for accurate prognosis, or for control or as means of treatment.

When is spinal puncture contraindicated? In any case in which subtentorial growth or large supra-tentorial growth is likely, the best rule being: in cases with choked disc.

When is puncture unnecessary? In patients with marked degenerative processes—usually elderly—in whom the findings may well be predicted beforehand, and in those in whom the treatment will not be affected thereby.

In the puncture of the psycho-neurotic reticence should be manifested, for the headache which so frequently follows the withdrawal of normal fluid in these becomes a disorder of no small proportion, alarming to the patient and annoying to the physician.

Owing to the somewhat promiscuous manner in which lumbar puncture is frequently performed I feel it a duty to go on record against this loose procedure, lest its rational use fall into disrepute.

* Read at the meeting of the American Neurological Association, May 21, 22 and 23, 1917.

I have been amazed, even in my own hospital, to find no hesitation in examining the spinal fluid in patients with marked choked disc. If the operator had seen with me the flattened medulla and foramen-grooved cerebellum of one patient dying some 14 hours after puncture, and had sat beside a man struggling for breath with pulse in the 50's, also following a few hours after puncture, he would certainly respect the requirements which I request in every new case: (1) take manometer reading, and if high (over 300 mm. with patient on side) keep an hourly chart of pulse and respiration; (2) examine fundi, and if there is choking of the discs do not puncture, unless there is much to gain therefrom, and then do it with extra caution, using a small-bored needle.

The reasons for examining the spinal fluid are increasing rapidly, each year revealing new indications for diagnostic or therapeutic purposes. These I will not enumerate, nor give lengthy statistics designed to prove that so many cells mean one disease and twice as many mean another; our tests are altogether too fluctuant for any such a, b, c method of diagnosis. Nor will I spend time in discussing the interesting but relatively simple findings in the acute meningitides; nor the employment of lumbar puncture in vertigo, uremia and headaches of toxic origin, all most interesting subjects. I do wish to set before you certain groups of cases met with by internist, surgeon and neurologist, in which clearer understanding of the case is rendered possible by examination of the spinal fluid, when correlated with the clinical findings.

The spinal fluid, it may be pointed out, is open to a great variety of tests; it is readily subject to physical, histological, bacteriologic, and biologic changes, and is therefore hardly less perceptible of important alteration than is the blood. The tests regularly employed by us are: pressure readings, the cell count with rough differential, proteid tests (alcohol and ammonium sulphate precipitation principally), Wassermann reaction, goldsol and ocular observation as to color, clearness and clotting. Each of these registers its bit of evidence from a different point of view, and an array of all the factors gives reliable information.

Let us first consider the group of cases for which we most frequently examine the spinal fluid, namely, syphilis of the central nervous system. The first question we wish to solve is: Is this syphilis of the nervous system? our second, If it is, is the process active? third, How active, and where situated? fourth, Is it amenable to treatment, and what kind of treatment is best for this individual patient?

Usually the tests speak conclusively for or against the diagnosis of syphilis, which in most cases satisfy us as to its nature and need no further words, but how shall we regard the case of the man with Argyll-Robertson pupils, absent tendon reflexes, ataxia, etc.—the typical tabetic—in whom tests are negative, cells, proteids, and Wassermann? We cannot say that the man is not tabetic. Clearly our tests here answer our second question, Is the syphilis active? It has been our experience that such patients are usually elderly, with original lesion a great many years back and tabetic symptoms and signs for many years; if symptoms persist they are those referable to the degeneration already existing; in them new signs of the disease do not appear; if pain persists it remains in the same area as always and if arthropathy occurs, it is in the segment of long-standing degeneration. It has been our experience to note several times Charcot joints appearing in such stationary cases. Besides these old-standing cases of tabes which have become arrested either with medication or without—for the clinical and laboratory picture is the same—we also find the early tabetic arrested in the same way. For example, Mrs. H. W., 45 years of age, whose husband is paretic, asks for examination *though herself without symptoms.* She is found to have Argyll-Robertson pupils and one absent Achilles jerk. On questioning her she says she had diplopia and neuritic pains ten years ago, and at that time pupillary abnormality was noted. Tests show a negative fluid. Can there be any doubt but that this woman had tabes and without treatment is a case of spontaneous arrest?

How shall we regard patients with isolated symptoms and signs usually attributed to syphilis in the event of negative tests? Here, I believe we must carefully differentiate the symptoms from the signs, with the understanding that symptoms developing in new areas of cord and brain speak usually for an active pathologic process, but that signs and some symptoms referable to a fixed area speak for degeneration of nerve fibers. The former should give positive, the latter may well give negative tests. With this conception in mind take this patient: a man of 40 rapidly becomes ataxic, so that he can just walk with aid of a cane; reflexes abolished; diagnosis "tabes." Tests show increased proteid reaction and cells, but negative Wassermann, blood and fluid; obviously an active case pathologically, but not obviously syphilitic. Without anti-luetic treatment he makes a complete recovery in six weeks, though reflexes remain in abeyance. Tests repeated at this time negative except for slight proteid increase. The man was not a tabetic at all.

In this connection the cases of Argyll-Robertson pupil as sole sign with negative tests are of great interest. In an analysis of 15 such cases at hand we find symptoms referable to spinal cord—root pain, difficulty in gait and bladder, and gastric crises—in 7, optic atrophy in 2, mental symptoms in 5, no symptoms in one. But in no case were symptoms of recent onset with the exception of the 5 mental cases, and of these only two closely resembled paresis; one of these is mentally sound five years subsequent to the making of the diagnosis, the other did not run the course of a paretic in the two years while under observation. We may then fairly say that the majority of this group showing Argyll-Robertson pupils, but in whom tests on blood and spinal fluid were negative, represent forms of cerebro-spinal syphilis, stationary so far as advancing pathological process is concerned, and that mental disturbances occurring in five of them were not those of general paresis.

Do the tests give any index of the activity of the syphilitic process? To a certain extent they do. In our cases large cell counts have usually been found in recent infection of the cerebrospinal axis, and without question signify a predominant meningeal inflammation. Treatment in these cases is for the most part eminently satisfactory. Of the forms of late degenerative nerve syphilis the spinal form (tabes) gives to my mind the most protean tests; cells, proteids, Wassermann and goldsol all vary within large limits, as may the blood from strongly positive to negative Wassermann. While reactions which are positive in all tests undoubtedly signify activity of the pathologic process, frequent is the case in which we are able to reduce the cells and proteids to normal and yet the Wassermann persists, and the patient shows no advancing symptoms. For diagnosis, therefore, we rely largely upon the Wassermann reaction, while in treatment we depend more upon cell count and proteid determination. Unfortunately in tabes, as has been said earlier, negative tests with or without treatment do not mean negative symptoms, but it is seldom that a patient with negative tests will exhibit new symptoms.

The degree of positiveness in tests has been found most important in general paresis. We have rarely found paresis without strongly positive tests both in blood and fluid, and conversely it has not been common to find other forms of nerve syphilis with all tests persistently strongly positive. The paretic goldsol curve in our cases has been found in paresis, but not alone in this form of syphilis. Time and again the diagnosis of paresis has been made by several neurologists in a case with tests partially positive and

the patient recovered. Occasionally a less serious prognosis has been made in a patient with strongly positive reactions and said patient has subsequently become a typical paretic. Above all, the patient with cerebral symptoms, with all tests strongly positive, the latter *not materially influenced by intensive treatment* should be looked upon as potentially paretic. As examples: Mr. H. C. D. was in 1912 unequivocally diagnosticated a paretic, spinal fluid showed 120 cells, positive proteid tests and strongly positive Wassermann, but the blood negative. His tests, as well as symptoms, yielded readily to treatment and he is quite well to-day. On the other hand a young woman in October, 1913, exhibited neurasthenic symptoms without mental deterioration, and because of positive tests (strongly positive both blood and fluid) was considered as exhibiting "latent nerve syphilis." Treatment was of no lasting value and on August 3, 1915, she was dead—a typical paretic.

One more point in connection with the syphilitic cases: those in whom tests on the spinal fluid are negative throughout, but who present positive blood Wassermann reactions. These it seems to me are not cases of cerebro-spinal syphilis at all, but of vascular syphilis, the nervous system being affected in a secondary manner. Patients with this type of tests are frequently incorrectly diagnosticated general paresis. One example will suffice: Mr. J. J. M., 60 years of age, presented a seeming mental deterioration of marked degree, with tremor of tongue, bulbar speech and apparently no memory at all. Blood was positive, spinal fluid negative. Under mercury and iodide he made remarkable and prompt improvement, and to-day, four years later, presents none of these stigmata.

I should like to speak of many more phases of syphilis in connection with these tests—the differentiation of types of optic atrophy, of syphilitic epilepsies, etc., but time does not permit.

The significance of *increased pressure of the spinal fluid* is of interest. One point in technique should be emphasized: a guess as to pressure by noting the rate of flow is always misleading, unless the fluid spurts out in a stream—a thing which should never be allowed. I have seen a few drops a minute rise to brain tumor pressure in the manometer. Normally the pressure lies between 100 mm. and 200 mm. as the fluid rises in the manometer with patient horizontal. This figure is considerably raised with increase of blood pressure up to about 250 mm. It is also raised to about this same height in some chronic cerebral inflammatory disorders—syphilis and tuberculosis—and higher still in acute conditions. Above 300 mm. we should surely look for some local process caus-

ing increased intracranial pressure, and as tumors with choked disc are likely to give readings over 400 mm. we may find in pressure readings an early diagnostic sign of intracranial mischief. In the case of the man mentioned early in this paper, whose condition subsequent to puncture was so alarming, a pressure of 360 mm. first drew my attention to the possibility of an existing brain tumor. Recently I was asked to examine the fluid in the case of a supposed tabetic; my report was that the tests were not confirmatory of tabes but suggested intracranial trouble, based on a spinal fluid pressure of 300 mm. (blood pressure being 110 systolic and 80 diastolic). Shortly afterward an insidious but unmistakable hemiplegia developed.

Concerning low pressure I cannot be dogmatic. Long-standing tabetics—usually inactive—have frequently given readings below 100 mm.; but the importance of the finding appears to be nil. One group of cases does regularly show low pressure readings, and these we will now consider in closing. I refer to cases of cord compression.

Last year I published with Viets* a series of 12 cases in which the spinal fluid complete syndrome of Froin or the incomplete syndrome of Nonne was present—all proved cases of cord compression. An abundant number of such cases has now appeared in print to demonstrate the importance of this syndrome as evidence of pressure upon spinal cord, and a number of cases coming to my attention since have strengthened belief in its value. The characteristics of such a fluid may be summarized: colorless or yellow, obtained under low pressure; there may or may not be a clot on standing, proteids increased, cells usually absent. The theory of its occurrence as set forth by Mestrezat seems probable; that pressure on the cord forms a closed sac below, cutting off cerebral fluid from above and hence lowering the pressure; that into this closed sac fluid transudes from dilated vessels, giving increase of proteids, and if red cells are destroyed xanthochromia as well.

How does the converse work out in practice? Does a normal fluid exclude pressure upon cord? We have at hand 4 such normal fluids in patients upon whom operation was performed for supposed cord tumor. Two of them came to autopsy, showing combined system disease and multiple sclerosis respectively; in one a normal cord was found at operation, but the fourth showed a tumor at the cervical level. Negative findings therefore cannot be claimed to exclude the possibility of cord compression, but should be given due weight in assembling the data in a problematic case.

* J. A. M. A., LXVII, p. 1707, 1916.

It is impossible to summarize a paper such as this, but I should like to emphasize the great value to be derived from examination of the spinal fluid in many neurological disorders when all the findings are taken into account, with correlation with the clinical picture. It has been our experience time and again to make an incorrect diagnosis because the tests did not conform with the clinical conception of the case; more often we have been enabled by a proper interpretation of the tests to make a more accurate diagnosis and prognosis, and treat more rationally. The tests depend upon a great variety of pathological states and demand a thorough interpretation; they never lie.

PARANOIC CONDITION

By August Sauthoff, M.D.

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The object of this paper is to offer a possible explanation of the development of the delusions of a case of paranoic condition. In this instance the case selected is not of especial interest because it is typical, but rather because it seems to offer a better study of the underlying mechanisms.

This patient, J. M., aged fifty-three, native of Germany, married, father of four children, was admitted to this hospital on March 9, 1917.

The family history shows that his father became unable to look after himself when he grew to be an old man and that he died in the poorhouse at the age of eighty-four.

Personal history shows that he had the usual diseases of childhood. When he went to school he learned easily, was especially fond of drawing, but had difficulty in arithmetic. At the age of fourteen he was apprenticed to a glazier. Others often teased him because of his crooked back, but he never got into any quarrels. At the age of nineteen, while he was a journeyman, he was out of work for a period of three months. He kept on traveling and, as this was contrary to law, he was locked up for three days for vagrancy. At the age of twenty-five, in 1889, he came to the United States and one year later he had some trouble with a neighbor because he felt that the latter was too intimate with his wife. The case was finally dropped. Two years after that it seemed to him that his stepdaughter was too free in her associations with the boys, so he gave her a beating. For this he was locked up for five days.

About fourteen years ago he was a member of the union for a year and a half, but he could not see that he derived any benefit and so he dropped out.

The present trouble came on about eleven years ago. While he was working for the R. R. company he fell and injured his foot. He remained in the hospital for eight weeks and since that time he has felt that he was unable to work. He consulted lawyers in Duluth, Eau Claire and Superior with the intention of bringing suit. The lawyers advised him to swear that the tools with which he was obliged to work were defective, but he refused to do so and they told him they could not do anything for him. It seemed to him that the lawyers were against him. Somehow or other his case was postponed and postponed and he received no satisfaction. After that

he thought that people made fun of him and mocked him because he lost his case.

At that time he was living on a low piece of ground on the corner lot where the side street had not been opened, so he fenced that place and pastured his cow and heifer there. The city authorities objected to this and pulled his fence down. He was obliged to watch the cows. Sometimes he staked them out, but then the boys came and took the rope off, so that the cows ran loose. Then he determined to sell one of the animals, but no one would buy. He felt they did that just to annoy him. They wanted to see him chase around.

About two years after his injury the heifer that he regarded as something out of the ordinary and valued at $500, was struck by the train. The railroad company paid him $35. He was greatly dissatisfied and when the train went by after that he called the engineer names. For this he was put in the lock-up. There it was hot and close. He was much enraged and he felt as if he would suffocate. Then suddenly it seemed to him that he could hear a man and a woman calling him vile names. This talking persisted and remained with him for about a year.

Next spring when the annual thaw came the water flooded his lot, stood under his house and everything was damp inside. He had suffered this annoyance before and it seemed to him that he could not endure this any longer, so he ran out into the street and shouted "Fire!" For this he was locked up for several days, but then the matter was hushed up and nothing was done.

About three years before the European war he heard that when a man is in trouble and puts up the sign of distress, the government will come to his help. He was anxious to have the United States government help him, as it seemed to him he could get no justice anywhere. He then constructed a red, white and blue weather vane and put it on his house as a distress signal. People seemed glad to see the colors and as he did this work well, they acted as though they thought something of him. He kept the vane up, but it required some effort to keep the colors bright and he could not see that it helped very much. So when the war started he wrote on the side of his house with a piece of chalk, "Not that I am afraid of the greedy," "A Kaiser man." Then the people came and rubbed it off, but he kept marking it back on. They called him "Kaiser man," made fun of him and "swiped" his tools. He often chased them away, but he could not call the police, as they were on the other side. Whenever the Germans were gaining the people became greatly excited and bothered him all the more. Then the socialists came and wanted to win him over. After that he felt that the different parties wanted to induce him to join them. He often noticed remarks about religion and socialism and he knew they were intended for him. About a year ago a man whose wife was a German Catholic bought a place near his. This place was worth only $300, but that man paid $500 and it came to him that this man must have some secret purpose. He had heard some remarks about black art, and he thought that possibly this man had something to do with

that. Then it occurred to him that this woman was a Catholic, that his own father had been a Catholic and that he himself was a Protestant. He thought that maybe the Catholics were back of all his annoyances and were persecuting him because he did not profess his father's religion. At other times it seemed as if there were so many different parties involved that there could not be any concerted action. At one time he suspected the socialists, but lately the English. He had heard that a new party had been formed for the purpose of killing off all the Germans. They had persecuted him in so many ways. Wherever he worked they did not like him. They always paid him the lowest wages and when he received fairly good pay he had to do the work of two men. No matter what business he started they interfered. They even went into his chicken coop and injured the chickens' combs. They turned his children against him. On the street they looked at him in a strange way, made signs and pointed at him.

They bothered him so that finally he wanted to go to the poorhouse, but after he started out they caused his coat to get so heavy that he could hardly walk, so he turned around and went home. When he arrived there the neighbor called out: "He is going to break the window." This irritated him and he called the latter a few names and told him that if he only had a rifle he would shoot him. For this he was arrested and placed in jail. After he was sent to this hospital he heard the talking more distinctly. The female voice which he called a siren and a witch called loudly and gently; at times she wept; at times she seemed near by, at other times far away. Then he decided that this was black art. He had no idea how it was done, but he knew that people who sold themselves to the devil could do such work. It was his consolation that the more a good Christian had to suffer the better would be his lot in the Hereafter. But still, if he were sure of his persecutor he would put a thirty-eight bullet into him. If the doctor would only write to Lewis Hill and collect that $20,000 that is due him for his injury then he could follow his persecutors even to China. If that money were paid to him then everything would be all right. Then people could see that he received justice and when a man is respected by the law he is respected by everyone and no one can abuse him with impunity.

Now why does this man entertain these ideas? Let us stop and consider.

Every individual forms a certain opinion of himself in relation to his surroundings. He also believes that his neighbors have a certain regard for him. If now, something happens which tends to detract from his self-respect, he at once tries to correct matters. If he can do so at once he is satisfied and his equilibrium is re-established. The greater his self-love the more difficult it will be for him to make allowances for the demands of others or to over-

look their encroachments and the greater will be his chances for failure at readjustment.

Now when this man was injured he felt that he should have a certain compensation, and when he did not receive it his self-respect was slighted. His self-regarding sentiment suffered an affront and he could not reconcile himself to this thought. His pride demanded an explanation and he found one by saying that they did not treat him properly. He developed delusions of persecution. He stated that others were against him. In that way he saved himself from the painful realization that he was not as deserving as he had thought. A delusion of persecution is the simplest kind of an excuse. If a child in school does not get along the teacher is down on him. When he loses a plaything someone has taken it. A certain mischievous, destructive patient in this hospital whenever taken to task for his misdeeds invariably says: "He done it."

When an individual wishes a certain thing and receives it, he becomes happy, but if an obstruction is placed in his path he becomes angry and the instinct to fight is aroused. If then conditions are such that he cannot fight, the feeling of that emotional system becomes intensified and he begins to think.

This patient became angry; his anger persisted; he was in a chronic state of resentment. Whenever anything went wrong the feeling of anger was at once intensified. The thought that others did not treat him properly was associated with this emotion, and so whenever he suffered a reverse his thoughts at once turned toward his persecutors. No matter what occurred that was contrary to his wishes his persecutors were to blame. When his cow got loose others did it. Even when the chickens' combs got injured in February someone did it. It did not occur to him that the frost might have injured the chickens' combs. Nothing came to his mind but the thought of his enemies. He looked no further, did not stop to reflect and weigh the various possibilities and then decide in the light of the sum total of his fund of information. To use a common expression, he allowed his feelings to get away with his common sense. His thoughts operated by short processes. Being under unusual emotion he did not have the clear vision requisite for the proper development of the logical processes. He jumped at conclusions. At the time the pressure was too great for the usual ordinary pathway. The extra energy of the emotion leaped over or burned off the insolation and attached itself to other ideas. There was a short circuit formed.

But why should all this disturbance take place? Why is the

self-regarding sentiment so important? The reason is: it involves the instinct of self-preservation. The two fundamental instincts in every individual are those that tend to preserve the individual and those that tend to preserve the race. The instincts are the sources of the energy that produces thought and action. The self-regarding sentiment is essential to self-preservation and so calls forth unusual energy, which in this instance goes to feeling and then thinking, striving toward the fulfilment of its aim.

Whenever an impulse is blocked a feeling of tension results. There is a pressure of energy to find its natural aim or outlet. This tension results in uneasiness and apprehension and consequently places the individual in an expectant frame of mind. This becomes more evident if we think of the eagerness displayed by a dog held away from his food; the nervous trembling of a cat stalking a bird; the wild look in the eye of the male cat during the mating season when he is interrupted in his advances toward his affinity.

In this patient the prolonged desire to change his condition caused tension or uneasiness and he was placed in a state of expectation. His yearning to have his wish gratified and to receive recognition caused him to look about for some kind of a response. He attempted to fit things that occurred near him into his case. In other words, he developed delusions of reference. It seemed to him that things had some relation to him. In his expectant mood he was more sensitive and more deeply affected. He felt that he was not getting along in life. He could not follow his aim, could not work out his energy as he wished and so it seemed to him that others prevented. Consequently he wondered what they wanted. He looked for signs to tell him. When he heard the word socialist or republican he at once jumped at the conclusion that they wanted him to be one. Here again there was the same short circuit. Due to the instability of the nervous system, the impulse did not follow the long course of reasoning requisite for proper elaboration. It jumped over onto nearby wires. There was absent the poise, the tenacity necessary to carry the impulse along the paths employed in normal thinking. The projectile force was lacking.

Again, what caused him to hear voices? After he had, according to his views, suffered great wrongs and then had insult added to injury by being locked up he became intensely excited. His mind worked actively, was overcharged with energy seeking expression and then again the short circuit was formed. Past memories were revived so actively that he believed he heard them. He developed hallucinations of hearing. The voices that he heard

were about the same as the epithets he had heaped upon the engineer. Moreover, the emotion experienced was the same in each instance.

Finally, when he went to the poorhouse, he did not really want to go but did so as a surrender to his persecutors. Subconsciously his pride was working against this step. In consequence of this internal conflict his energy became divided. There was lacking the unity of purpose requisite for the carrying out of his apparent intention. The result was that he grew weaker in his effort. His journey became more laborious. As he was not accustomed to wearing a coat this seemed heavy to him. Again he could not appreciate that there was any possible change in him, but in accordance with his habit of thinking he at once blamed his persecutors. He had heard others talking about witchcraft and magic. He had always believed in these. They were a reality to him and as he could not understand how his enemies could reach him except by these means he at once accepted this explanation. Again there was a short circuit in his thoughts. His energy traveled the path of least resistance. Thus he developed delusions of influence.

To briefly summarize: Instinct is the source of all psychophysical energy.

The self-regarding sentiment is built upon the instinct of self-preservation.

When this instinct is involved, an unusual amount of energy is liberated.

This energy manifests itself as emotion and thought. As a result of the extreme sensitiveness of the nerves of the paranoid individual thoughts operate by short circuits.

Society Proceedings

AMERICAN NEUROLOGICAL ASSOCIATION

Forty-third Annual Meeting, May 21, 22 and 23, 1917, held in Boston, Mass.

The President, Dr. E. W. Taylor, in the Chair

(*Continued from page 376*)

FURTHER EVIDENCE IN SUPPORT OF THE GLANDULAR NATURE OF THE PINEAL BODY

By Frederick Tilney, M.D.

An essential question to be decided is the pluri-potency of the central axis in its derivatives. Evidence of this may be found in the epithelial roof plate of the brain. The glandular characters of the paraphysis and the choroid plexus are generally recognized. These structures, derived from the roof plate of the interbrain, establish the possibility that the epiphysis may, likewise, be glandular. The comparative histology of the pineal body discloses definitely glandular characteristics in reptiles, birds, and some of the lower mammals. The ontogeny of the structure followed through the several stages of development in the higher mammals, including man, furnishes tenable evidence that the pineal body is a gland. Certain of the pineal neoplasms, particularly in their relation to the syndrome of Pellezzi (macro-genitosomia præcox), tend to substantiate this view.

Dr. Paton asked Dr. Tilney whether he used the methods suggested by Dr. Bensley, of Chicago, in studying these secretory cells. It was a very interesting question to try to determine whether these cells were capable of functional activity. The speaker had had a somewhat similar problem in the embryo, trying to find out when such a glandular structure as the thyroid and the adrenal became functionally active; and as the question was a complex one he had become very cautious in drawing any conclusions. Dr. Tilney's illustrations were convincing as to the existence of a glandular type of cell in the pineal body.

STUDIES IN THE PATHOLOGY OF HUMAN AND EXPERIMENTAL POLIOMYELITIS

By Louis Casamajor, M.D., and Hubert S. Howe, M.D.

The material upon which this study is based includes eighteen cases of human poliomyelitis from the epidemic of 1916 and eighty experimental animals. Among the latter were *Macacus rhesus, Felis domesticus, Mus decumanus* and *Lepus*. The human cases gave a definite and constant pathological picture which was duplicated by the infection experimentally produced in

monkeys. The chief characteristics of the pathological change were manifested in reactions of the fixed and wandering connective tissue elements, as well as in parenchymatous alterations involving the ganglion cells of the neuraxis, the dorsal root ganglia, the nerves and the neuroglia. The principal addition to the pathology, as hitherto described, is a pronounced, fat-pigmentary degeneration in the cells of the pons. Poliomyelitis virus was injected intracerebrally into cats, rabbits and rats, but in no instance were the definite pathological changes of acute anterior poliomyelitis produced as the result of these experiments. Cats suffering from a febrile epidemic during the summer of 1916 presented symptoms similar to human poliomyelitis. Upon examination the spinal and cerebral changes did not resemble the recognized pathology of the Heine-Medin disease.

POLIOMYELITIS: A NEUROLOGICAL STUDY OF THE 1916 EPIDEMIC IN PHILADELPHIA

By T. H. Weisenburg, M.D.

Seven hundred and fifty cases studied. Pre-paralytic symptoms, with characteristic temperature, pulse and early manifestations. Onset of the paralysis with the recession of symptoms. The paralyses were more marked in the proximate portion of the limbs than the distal. Meningeal cases, in which frequently the symptoms were limited to the head, neck and shoulders, or to the lower limbs and lower back. Types of spinal cases, unusual bulbar and pontile forms. Unusual number of cerebral cases. Practically no cerebellar types. State of reflexes, dependent largely upon the quantity of increase of cerebrospinal fluid, altered by lumbar puncture. Spinal fluid findings; causes of death. Mortality. Treatment, use of serum, lumbar puncture, etc. Abortive types. Multiple cases. The question of contagion.

The papers by Drs. Casamajor and Howe, and Weisenburg were discussed together.

Dr. Jelliffe said that he believed Dr. Weisenburg was entirely too iconoclastic if he wished to reject two of the types as proposed, namely, the polyneuritic and the cerebellar forms. As to the former he had observed many and within his own family circle had had the uncomfortable experience of watching a severe polyneuritic type. That they might be considered as rare he was willing to admit, but the polyneuritic type should not be rejected. The cerebellar type was not infrequently met with. It showed in a number of minor ways other than ataxias, such as by nystagmus and other cerebellar signs. Dr. Jelliffe believed a new type might be erected. This could be termed the vegetative group. Its pathology depended upon the involvement of the vegetative nuclei in the lateral horns of the cord. Here vesical, rectal, vascular, kidney, liver, enteroptotic, bony and other phenomena might be grouped together advantageously. The syndrome of the vegetative disorders in poliomyelitis was almost unwritten and would make a large chapter in the future. Who knows but that certain dyscrasiæ, so-called, which later develop constitutional defect anomalies, might in the early years have had their fundamental pathology laid down in a poliomyelitis of the vegetative nuclei, the sensori-motor reflex arcs having remained intact.

Dr. Archambault considered that both papers on poliomyelitis had been extremely valuable. He wished to say a few words regarding some of the points brought out by Dr. Weisenburg, particularly. He felt the latter had made a very important statement when he brought out the fact that in poliomyelitis the method of extension of the paralysis was not necessarily to contiguous parts. In fact, the paralysis might begin in the leg, and then, without

involving the trunk, or even the arm, to any degree, give rise to paralysis of the cervical muscles. Dr. Archambault thought that this was a very strong point against the generally accepted doctrine that poliomyelitis is a disease in which the lesions extend by progressive intraspinal lymphogenous invasion.

The second point, wherein, however, the speaker could not agree with Dr. Weisenburg, was that because there are no definite cerebellar symptoms, or bulbar manifestations, that was a proof that these parts of the cerebrospinal axis are not involved. He quite fully realized that his experience had been very limited in comparison with that of Dr. Weisenburg; but he had examined the entire cerebrospinal axis in three cases and found lesions practically everywhere. They were not as marked, certainly, in the cerebellum, the cerebrum, or in the pons, as they were in the cord, but well-marked adventitial and interstitial infiltrations were found at various points in the subcortex, about the nuclei and deep white matter of the cerebellum and in the upper segments of the brain-stem.

Dr. Knapp said that, like Dr. Weisenburg, he had had in Boston the opportunity of studying a very large number of cases in the last epidemic, as most of them were admitted to the South Department of the City Hospital; and there, from the first outbreak of the epidemic, he had been asked by Dr. Place and Dr. Friedman to have neurological oversight over the patients; so that the speaker saw and examined personally most of the doubtful and rare cases, and saw a very large majority of them. He agreed with Dr. Weisenburg in many of his conclusions; but the so-called dromedary type of the epidemic was something he did not see. Most of the cases, however, did show some meningitic symptoms, some rigidity of the neck, etc. Pain, which Dr. Weisenburg had specified as so extreme, was not very great in his experience. There was a little pain. It was not always relieved by lumbar puncture. The true neuritic type of the disease in this epidemic was certainly rare; but he did not agree with Dr. Weisenburg in a skepticism as to its existence; for he had seen cases in which there had been a very distinct evidence of a true neuritis: not merely pain, etc., but very extreme tenderness all over the nerve trunks. The true Landry's type was also very rare, either ascending or descending. It was a very rare thing to see a steady progress, either upwards or downwards, along the spinal cord; although, in the first part of the epidemic, they had a very large number of the cases, from 10 to 20 to 25 per cent. of the cases, which were fatal, dying with respiratory symptoms; but the paralysis did not progress regularly as he had seen it in other cases, and as Landry himself described it, from the feet upward, involving the respiratory muscles last.

He had noted and been surprised, particularly, by one fact, namely, the skipping of the paralysis, the cases where the leg was affected, and then the paralysis, instead of progressing longitudinally up the cord, had skipped—affecting the shoulder. Or it sometimes affected the legs, and a facial paralysis was pretty common: in 8 or 10 per cent. of the cases they had had facial paralysis. In fact, the first case Dr. Knapp had been called on to see was at the request of Dr. Place, the patient, a child who had been in New York and had come from there when the epidemic broke out, and was brought to the South Department, where she came down with symptoms which at first made the speaker feel skeptical; as to diagnosis, she had fever, with rigidity of the neck, and an isolated facial paralysis, without paralysis of any of the other muscles.

In regard to the cerebrospinal fluid, he thought its examination as a diagnostic measure was of doubtful value. As such measure it had received great support in New York, and was regarded as almost infallible by the Harvard Commission and Dr. Emerson, who came to Boston several months ago to speak on poliomyelitis, having stated that errors of diagnosis by this method

were rare. While, of course, errors of diagnosis, even with the most inexperienced, were not often made in the ordinary typical case of poliomyelitis; yet in the atypical cases, the extreme cases, such errors had rather frequently been made. Of course, he had seen a great many of the rare cases, and the errors in diagnosis were based very largely upon making the diagnosis from the examination of the cerebrospinal fluid alone. An increase in the cell count was regarded as an invariable sign of poliomyelitis. A good many cases of tubercular meningitis had been sent to the South Department with a diagnosis of poliomyelitis; the speaker had been called in by Dr. Freedman to see one case in particular with the statement that he did not believe it was poliomyelitis. Dr. Knapp went in and looked at it; it was a case of spastic paralysis on one side of the body; it had an increased cell count, no meningitic symptoms but rigid pupils, widely dilated, about eight millimeters in diameter, and retino-choroiditis; an examination of the blood showed a positive Wassermann; and the diagnosis of poliomyelitis had been based upon the increased cell count. As he had said, the facial paralysis was very common, but a paralysis of other cranial nerves had been an exceedingly rare thing. The Babinski reflex, whereof Dr. Weisenburg had spoken, was also an exceedingly rare thing, the speaker not positively recalling more than one or two cases. He would, however, mention the phenomenon of a pseudo-Babinski in a case occurring some ten years ago, where he had been called as a consultant, which he had since seen many times: there was always an apparent Babinski in one foot; but that was not true Babinski, due to any spastic phenomena; it was a pseudo-Babinski, due to the fact that the plantar flexors, as one might say, were absolutely paralyzed. The patient had a little voluntary movement of extension of the great toe, and an irritation of the sole would cause the great toe to come up, because it was the only muscle left to move. It looked exactly like a Babinski.

The encephalitic cases had also been very rare. He recalled a few cases: one case rather doubtful, it seemed of the cerebellar type. The ataxic cases were, again, exceedingly rare, and might fairly be regarded as doubtful.

Dr. Chas. K. Mills said that he had seen a large number of the cases on which Dr. Weisenburg's statements were based, but had little to say in addition to what Dr. Weisenburg had put forth, as the latter had so thoroughly presented the results of the investigations. The speaker believed, however, that there is an occasional neuritic case, having been convinced that, independently of this epidemic so largely studied, he had seen cases of this sort. He had studied the disease in 1907, in the Lehigh Valley, and off and on for many years, and he had occasionally seen a case which could not be explained on the theory simply of meningitis plus poliomyelitis.

He had observed one case to which Dr. Weisenburg referred, of the cerebellar type. He had seen two other cases, one from the State of Delaware, the other from the northern part of Pennsylvania, in both of which cases the symptoms clearly pointed to cerebellar involvement.

Dr. Mills's investigations, in addition to clinical observations, had been largely directed to the solution of the question of the etiology and of the transfer of the disease. He had come to the conclusion that personal contact as the chief cause of the communication of the disease had by no means been established. In Philadelphia those with whom he was associated could not trace an instance of transfer or communication of the disease in the large Philadelphia hospital where hundreds of cases were congregated, either directly or by a third party. Not only in Philadelphia had Dr. Mills studied the disease, but in West Virginia, during the recent winter epidemic, with the assistance of Dr. Baldwin Lucke. In one third of the cases examined by Dr. Lucke no possible human contact could apparently be traced; in another third it was very doubtful; while in the remaining third the evidence was in

favor of the contact theory. Great harm, as well perhaps some good, had been done by the manner in which the emphasis had been laid on the theory of human contagiousness.

The interstate quarantine of poliomyelitis presents some remarkable features. Here we have scarlet fever, measles, diphtheria, even smallpox, diseases eminently contagious, and yet no steps had been taken, so far as he knew, to quarantine, in a State way, with regard to these diseases.

Dr. Mills's conviction still was, what he had expressed several years previously, that the disease is of protozoan origin and of non-human, and probably, in spite of some data against the hypothesis, of insectile etiology.

Dr. Leszynsky said that in the epidemic of poliomyelitis in New York City during the last summer, as the audience well knew, the neurologists were practically ignored, and the management of these cases remained in the hands of the epidemiologists, pediatricians and orthopedic surgeons.

A committee had been formed of members of the New York Neurological Society with a sub-committee representing the Public Health Committee of the New York Academy of Medicine, of which Dr. C. L. Dana is chairman. During the last few months they held a number of meetings, and many of the men who were thoroughly familiar with the subject, and who had observed and studied large numbers of these cases during the recent epidemic appeared before them. The conclusions reached were very much the same as that expressed by Dr. Weisenburg in his paper. The report of this committee would no doubt be published in a short time.

Dr. Patrick asked whether Dr. Weisenburg did not consider the Babinski sign in children under two as rather unreliable.

Dr. Angell wished to suggest one point in connection with the treatment of these cases in the acute stage, which he fancied many of those present had used. His routine rule was to put those children immediately into a warm bath, of a temperature of 98° to 100°, for one half to an hour, and he got better results from that than from any other method of treatment he knew of. He bathed them twice a day, with great relief from the rigidity. He knew not whether it had any effect in restricting the paralysis, but it did upon the suffering.

Dr. Fisher, of New York City, said he had had the opportunity of seeing several hundred of these cases at the Willard Parker Hospital in the epidemic of last summer. The picture was about as Dr. Weisenburg had put it. Dr. Fisher, however, found more cases of the cerebellar and doubtful type than the reader had referred to. There is a marked distinction between the character of the pain in the two classes. He did not think the pain was altogether psychic in those cases. In several cases of meningitis puncture had been tried, and he could not see that it had effected any lasting relief. The treatment employed at the Willard Parker Hospital was about the same as Dr. Weisenburg had reported. There were, however, many strong advocates of the serum injection. From the cases that had been under the speaker's observation no positive conclusion as to its efficacy could be drawn.

Dr. E. W. Taylor said it was a most noteworthy fact that this Association, representing men of very wide experience in this matter, uniformly, either positively or by not speaking negatively, maintained that this is not a contagious condition, not, at least, in the sense in which the term contagion is ordinarily used, an opinion in which he thoroughly agreed.

Dr. Taylor did not know what could be done about it; but he felt that some action should be taken to prevent the authorities from inflicting a quarantine which is useless, and not only useless, but, it seemed to him, absolutely harmful, in so far as it inspired a perfectly unreasoning terror of the disease.

Dr. W. A. Jones, of Minneapolis, Minn., said that as a member of the State Board of Health of Minnesota he had been much interested in the

epidemics of poliomyelitis and cerebrospinal meningitis. Minnesota has a regulation governing the quarantine of poliomyelitis cases as well as cerebrospinal meningitis. The quarantine, however, does not cover the entire household, simply provides that the patient shall be confined in a room under the care of some individual for a period of two, or perhaps three weeks, based upon the conditions found; that other members of the family may have access to their business and may go and come as they please. He believed that it would be unwise at present for the American Neurological Association to go on record as absolutely condemning the quarantining of poliomyelitis for the reason that we may occasionally have a case of cerebrospinal meningitis which has erroneously been diagnosed as poliomyelitis. He thought the Association might modify by suggestions some of the quarantine laws, and particularly those that applied to interstate travel. He felt, however, that there should be some regulation and check on the poliomyelitis case, first that it keeps a great many people away from the house and away from the sick patient, and also prevents alarm which is erroneously supposed to exist in the poliomyelitic case.

He asked that the expression of the Association be very carefully exercised, for the reason that there is more or less jealousy, or perhaps we may say ambition, among the orthopedists, pediatrists and neurologists, and if this Association is to go on record as absolutely opposed to quarantine of any sort, some of the men might imply that the neurologists might feel that they had been deprived of some of their consultation work.

Dr. Jones asked Dr. Weisenburg whether he considered pressure of fluid in the spinal canal of great importance in the diagnosis of poliomyelitis.

Dr. Prince, of Boston, said the resolution ought to be very carefully worded; that is to say, it should be a responsible resolution, and should exactly state the facts. After all, the boards of health and public officials had the responsibility, and the responsibility was not upon the Association. If the latter considered the quarantine rules improper, it should have spoken before: the responsibility there lay with it for not having come out and given its opinion. From the discussion it would appear some of the quarantine rules had been ridiculous. His next door neighbor in a suburban town, for instance, had gone to New York, and, coming back, was quarantined for weeks. However, if the Association should proclaim, as a statement of fact, that the evidence thus far presented had not shown that it was a contagious disease, and that we believed the methods pursued to date had been unreasonable, and so on, he thought it would be a very good thing to do, but that resolution ought to be carefully considered by a committee of this Association before it goes upon record on this matter; and he would suggest the chairman appoint a committee of two or three to consider it and report at the meeting of the morrow. The Association should be very careful in a matter of this kind when giving a responsible opinion.

Dr. Knapp said that last fall the neurologists had given considerable expression of their opinion, but it had had no effect whatever on the various commissions and boards of health, who had done their work without any neurologists to help them; and he felt the Association should be very definite in the expression of its opinion, as another epidemic might occur this summer and the boards would still continue to proclaim their ignorance.

Dr. Prince said there was undoubtedly considerable hysteria on the subject in the community. Nevertheless, the public wanted information which should embrace the known facts and not opinion only. At present it was looking to and guiding itself entirely by the epidemiologists and boards of health and the rules and regulations laid down by the latter. These were largely based on opinion and individual views of public policy. He thought it quite proper for the Association, if it desired, to take the matter up, to

state the evidence, clinical as well as epidemiological, as to the dangers of the disease so that each one would know what is known and what is not known, and judge for himself. In this way the tendency to public hysteria would be allayed. It is the education of the public in facts that is needed. It is mystery that does the harm. He thought that such a statement might possibly have a good effect upon local boards of health, particularly in small towns which now "play safe" and go to extremes. It might give them moral support in maintaining conservatism.

Dr. Leszynsky said it was quite a different matter to appoint a committee from this organization representing different parts of the United States, as compared with a local committee that might be appointed through the Boston Society of Neurology or the New York Neurological Society. He was opposed to the appointment of such a committee as being impracticable under existing conditions.

Dr. Fisher said he believed a statement from an authoritative body such as the American Neurological Association of great value. It would go a great way in relieving the unnecessary anxiety regarding the fear of contagion in the disease.

Dr. Weisenburg, in closing, said in answer to Dr. Jelliffe's question that in his experience with the Philadelphia epidemic there was only one, strictly speaking, cerebellar case. In this patient the symptoms disappeared in a few days. There were, of course, a number of pontine cases in which there were cerebellar symptoms, but these always promptly disappeared. A great many cases were called to his attention which were supposedly cerebellar, but these turned out to be cases in which the disturbance of gait was the result of weakness in the limbs.

Regarding the involvement of the peripheral nerves in poliomyelitis, there was not a single instance in which there was peripheral nerve palsy. Of course, every patient had a certain amount of pain in the limbs and in the beginning there is pain on pressure in practically all cases. In a few this persists throughout the disease but as a rule the pains disappear in the course of a few weeks. It was Dr. Weisenburg's opinion that these pains were entirely meningitic in character and were not the result of peripheral nerve disease. This can be proved by the fact that lumbar puncture nearly always caused a lessening of the pains and in those cases in which promptly repeated lumbar puncture was done pains were not at all a permanent symptom. Dr. Weisenburg stated that he regarded meningitis as a constant accompaniment of poliomyelitis and that the pains were the result of meningeal involvement.

Regarding Dr. Patrick's question there were undoubted cases in which the Babinski reflex was the result of disease of the lateral columns, but in most instances the Babinski phenomenon accompanied the increase of reflexes and general hyper-excitability of the muscles which was due to an increase of intraspinal pressure. Promptly repeated lumbar puncture would cause a disappearance of the Babinski phenomenon, irritability of the muscles and increased reflexes in the majority of cases.

Regarding the fifth nerve, he saw a number of instances in which the motor fifth nerve was involved. There was no instance in which the sensory fifth nerve was diseased, although this may have been present.

Regarding the question of personal contagion, he was convinced that the disease was not contagious in the sense that measles, whooping cough and similar diseases are contagious. In all multiple cases, with one exception, the disease came on at the same time, this arguing, of course, for a similar source of infection rather than personal contagion of the disease.

MEDICAL TREATMENT OF EXOPHTHALMIC GOITER: SPECIAL REFERENCE TO USE OF CORPUS LUTEUM

By Herman H. Hoppe, M.D.

Inter-relation of thyroid and ovary. Histology and physiology of corpus luteum; a critical analysis of fifteen cases observed during the past two years.

Dr. Camp thought that the treatment suggested by Dr. Hoppe should be compared with the results of surgical intervention in these cases, and was very glad to hear him suggest an alternative treatment. The speaker had seen many cases which had been operated upon and, although they had been relieved to some extent, at least so far as their loss of weight and vascular symptoms were concerned, they had seemed to him to be left in an almost hopelessly bad nervous condition. The operations in the cases the speaker had seen had been done by competent operators, some of the best known in the world; and he would advise against surgical intervention in most cases except as a measure of last resort. Therefore, he was very glad to hear Dr. Hoppe's results with this other treatment.

Dr .Paton was very much interested in the suggestion made as to the relation between the different glands of internal secretion. The consideration of possible relations opens up a very important line of investigation.

A year ago he had brought the subject to the attention of this Association, and emphasized the point that the thyroid seems to be the first one of the glands of internal secretion that is thrown into the nervous circuit; then the adrenals come; and then, much later, the sex glands. He was not sure that the moment when these organs are thrown into the circuit is always constant. There may be a good deal of variation in the time but not in the order of sequence. He wished that the investigators could be induced to take up this problem of the relation of the functional activity of the thyroid to the large bundle of neurofibrils from the vagus.

As the speaker had stated before, the sex glands are quite late in coming into the circuit, and evidently have very little to do with the growth processes during the early life of the embryo. None of these glands of internal secretion apparently affect the early life of the embryo. This we should keep in mind. Later these organs may modify growth; but the process of growth is pretty well started long before any of the internal secretions have any effect upon the organism. Of course, it is very difficult to determine just the moment when these glands do begin to secrete. We have not any histological methods of investigation that are satisfactory, as had been brought out by the discussion on Dr. Tilney's paper. This field is a very interesting one, and he believed if a number of investigators concentrated their attention upon the early life of the embryo, a great many problems so very important to the neurologists would soon find their solution.

Dr. H. Douglas Singer and Dr. S. N. Clark read a paper on Psychoses Associated with Diabetes Mellitus.

Dr. White, of Washington, D. C., said he had been very much interested in the paper, and that such clinical studies he believed to be of tremendous importance at this particular time. The psychological end of the problem was an important one and had not been sufficiently emphasized. These disturbances may be largely of psychogenic origin, and the internists do not see that point of view at all and look to some fundamental metabolic disturbance. Here is a situation where diabetes mellitus, as a result of Cannon's work on the relation of sugar in the blood to adrenal stimulation and back of that

to emotional disturbance, forms a point of union between the psychogenic side of the difficulty and the organic metabolic side, and, it seemed to him, offers, especially in the adrenalogenic types of diabetes, a very real, splendid opportunity for getting the two points of view together on common ground. It seemed to him very plain that this situation could be explained, in part at least, by a psychogenic disturbance which is of the nature of fear in the terms of Cannon.

The only thing that we have to consider, however, is that the fear is not conscious, but it is an unconscious fear, and that is fairly evident from the previous disturbance that works through in Dr. Singer's cases. Very patently these cases are cases of more or less panic, with acute hallucination, and the first of these cases occurred in later life, late in the fourth decade when this type of case is most common: not because it is the fourth decade, but because the psychological mechanisms for compensation tend to break down at that time, just exactly as the metabolic processes that are physiologically bankrupt tend to break down from the fourth decade on.

It would have been interesting if Dr. Singer had presented the content of the hallucinations. That would have indicated, Dr. White was sure, the type of conflict; but he was also sure it was somewhat of a panicky type: it it difficult to express the anxiety in these cases. There is one thing that the speaker was not familiar with, and that he had been dwelling upon during the reading, and it seemed to him as if the explanation could be suspected: the absence of sugar at the time that the onset is at its height. There we have, he fancied, a balanced compensation between the psychologic and metabolic level. The emotion is having difficulty in getting its discharge and the unconscious is breaking through at the psychological level. During repression, on the other hand, there would then be the breaking through at the metabolic level.

In a great many disturbances of these emotional cases everybody knows there is temporary glycosuria under conditions of great emotional stress, and that such cases are very common, and we have to consider some way of explaining them, and the work that Cannon has done seems to be the point of contact between the organicists and the functionalists which will help us to get together on some common ground and use both the psychological and the metabolic material for getting an idea of what the individual as a whole is endeavoring to accomplish by these various compensatory reactions.

Dr. Starr thought it a little difficult to accept Dr. White's explanation, because it seemed to him that if there is any rapid action in the body it is the rapid reaction of the mind upon the organs. As Dr. Hoppe read his paper the speaker was thinking of the fact that the effect of a quiet talk with a patient suffering from Graves's disease was very often to reduce the pulse rate eighteen to twenty beats, an immediate effect of the mind upon the body. Dr. McCarthy had last night spoken of the soldiers in the trenches sweating with fear. They did not sweat the next day, or the next week: they sweated right there. Take a lot of students that are being examined: they will pass much water right after the examination; they do not wait until the next day for that impression; so it seemed to him that these interactions of the mind upon the body are immediate and, therefore, that the explanation given would not hold.

Dr. Hoppe asked Dr. Singer whether or not the blood examination was made for sugar; because he thought in that way one naturally gets better results, since it is frequently found that when the sugar is not excreted it accumulates in the blood; and, therefore, the increase in the symptomatology ought to be in direct proportion to the decrease in the amount of sugar ex-

creted. That was the way, he thought, in which these findings might be correlated.

Dr. Jelliffe thought Dr. Prince was perfectly consistent in his objections although to his way of thinking they were not very intelligent ones, and that Dr. Starr had stated, without his perceiving it, the reason why the correlations cannot be readily traced. In other words, the psychological facts are not there, the record, as Dr. Singer has given it, being the only source of information. None of the psychological facts are there, and lacking them, the correlations, of course, cannot be developed. Dr. White had pointed out a few of the possible psychological factors and greater importance would attach itself to the discussion if it were possible to bring out the relationships between the different capabilities of energy displacements within the body. That there is a close relationship between physico-chemical levels and psychological levels there can be no doubt, and when all the facts are in the energy displacements at all the different levels might be traced intelligently.

Dr. Prince was in a measure correct in saying that Dr. Cannon found that in the cat the sugar increases with the fear. Dr. Prince did not, however, seem to comprehend that perhaps the cat did not have a psychological level. If the cat had had a psychological outlet, then perhaps the cat's sugar would have gone down. Dr. Starr was also correct in saying that acute impressions are often relieved very quickly, but Dr. Starr was not taking into consideration the more prolonged, unconscious, and continuous effects. Apart from the diabetic situation, the psychiatrist is constantly meeting with this energy interchange between different levels. Bertschinger had shown it beautifully in catatonia, where, during the catatonic interval, somatic disorders clear up, all to reappear as the mental condition becomes clearer. The body seems to be the scapegoat for the psyche here. Dr. Jelliffe thought that everybody whose experience had included observation on patients with hysterical outlets could appreciate that, as the psychological level output becomes less effective, the somatic output becomes the carrier of the energy. Exactly as in the acute catatonic state, physical ills disappear in large measure, whereas, when the patients get over their acute catatonic interval, the somatic ills mount up. Such patients had had asthmas, diabetes, albuminuria, constant colds in the head, itching skins, psoriasis, eczema, and so on, in the comparatively well periods. Thus in the catatonic, hysterical or other type of psychotic periods, many of these somatic ills clear up, to reappear with regularity according to the mental state, showing that there are these correlations between energy discharge of the different levels. If we would remain more open-eyed to the facts, we could establish these and many more correlations without much difficulty.

Dr. Paton said we ought to keep our minds open and free from prejudice on the subject of the reactions of the human animal. We can trace the genesis of activities, such as the instincts, by following in the embryo the extension of the range of adjustments from one level to the next, and it was possible also to determine the time when the mechanisms of adjustment were influenced by organs outside of the nervous system. The thyroid and adrenals entered the circuit long before the sex glands, and therefore the latter were not of primary importance in determining the mechanisms connected with the earliest instincts. It is very significant that the thyroid and adrenals come into the circuit so very early.

Dr. Singer wished to emphasize in connection with the first case that there was no albuminuria when the sugar was present, but albumen and casts were found during the sugar-free period. This very strongly suggests that at this time there was an acute exacerbation of a chronic parenchymatous change in the kidneys.

As he understood Cannon's work, the increase of sugar in emotion represents an increase of combustible material made available for the carrying out of the purposes of the emotion. Furthermore, this sugar increase is in the blood and not in the urine. Dr. Hoppe's question is therefore very much to the point and Dr. Singer much regretted that he could not answer it, as the blood sugar had not been estimated. Hypothetically it might be suggested that possibly during the period of apprehensive excitement the patient was burning up more sugar and hence there was less to excrete in the urine.

(*To be continued*)

Periscope

Revue Neurologique

Abstracted by Dr. C. D. Camp, of Ann Arbor, Mich.

(An. XXII, No. 22, October, 1915)

1. Bulbar Palsy of Peripheral Origin with Double Exophthalmus Due to Sinus Thrombosis. A. Halipré and Paul Petit.
2. Conjugate Deviation "Syncinetique" of the Eyes in Hemiplegia. Mario Prezzolini.
3. Observations on the "Achilles Reflex" in Sciatica. A. Accornero.
4. Two Cases of Chronic Tetanus with Cure. Nathalie Zyberlast.
5. General Paralysis and Traumatism. R. Benon.

1. *Bulbar Palsy.*—A boy of ten complained of pain in both ears and some diminution of hearing, but continued at school. Two months later the pain in the ears became more severe, but there was no discharge from the ears. A few days later he developed exophthalmus and had some headache and vomiting. The exophthalmus gradually increased. In addition he developed bilateral facial palsy with paralysis of the soft palate and difficulty in speaking and swallowing. There was also progressive diminution in hearing. Autopsy showed thrombosis of the superior and inferior petrosal sinuses, the lateral sinuses to the jugular bulb, and the superior longitudinal sinus. The ophthalmic veins were thrombosed and the orbit filled with organized clot. The source was an otitis media.

2. *Conjugate Deviation of the Eyes.*—In a certain number of hemiplegias of organic cerebral origin it is observed that coincident with the closing of the eyes there is a conjugate deviation of the eyes to one side, which is generally the paralyzed side. The author proposes the appellation "syncinetique" for the conjugate deviation in order to express its genesis and mechanism. When this form of conjugate deviation exists it speaks in favor of a localization of the lesion above the pons.

3. *Achilles Reflex in Sciatica.*—The Achilles reflex is affected in about 50 per cent. of cases. In 3 out of 126 cases it was abolished on both sides without apparent evidence of disease of the cerebral nervous system. There is no parallelism between the gravity of the case and the disturbance of the reflex.

4. *Chronic Tetanus.*—The first patient was a woman, 27 years old, who suddenly became unable to open her jaw. Three weeks later she developed general rigidity. The temperature remained normal, the pulse beat about 120 per minute. The cerebrospinal fluid was normal and its injection into an animal gave no results. The patient recovered in two months under the administration of chloral hydrate and electric light baths. The second case was in a girl of eight years who had spontaneous contractures in the right side. Three weeks later she developed trismus. When examined in a hospital three months later she could not open the jaws more than a centimeter. The "face" deviated to the right. Both eyes closed normally. There was no rigidity of the neck. Rapid improvement and cure in one month under treatment with chloral hydrate and sweat baths.

5. *General Paralysis.*—A critical review of the subject with extensive bibliography.

(An. XXII, No. 23–24. November–December, 1915)

1. Visual Disturbances Due to Lesions in the Intracerebral Optic Fibers and in the Visual Cortical Areas following Injuries of the Head by Projectiles. P. Marie and Chas. Chatelin.
2. Contribution to the Study of Nervous Disturbances of Reflex Origin. Examination during Chloroform Anesthesia. J. Babinski and J. Froment.
3. The Relation of Tremor to Emotional States. Gilbert Ballet.
4. Camptocormia. Curvature of the Trunk following Injuries to the Back and to the Lumbar Region. A. Souques and Mme. Rosanoff-Saloff.
5. A Peculiar Limp Observed in "Injured Neurotics." Remarks on the Morphology and Physiology. Henry Meige.
6. Hyperesthesia always Signifies "Hyperalgesia." Henri Pieron.
7. The "Sign of the Sterno"—a Symptom of Irritation of the Medulla. Roger Dupouy.

1. *Visual Disturbance.*—The patients studied were those in which injuries to the occipital region by bullets or pieces of shell caused disturbance in the visual fields. Each case was studied by X-ray to show the exact location of the projectile if it remained or to show the site of the opening in the skull if it had been removed by trephining. Five cases presented lateral homonymous hemianopsia. One case showed lateral homonymous hemiachromatopsia. There were two cases of cortical blindness in which vision later returned but with extremely retracted viscual fields. In five cases there was inferior horizontal hemianopsia but with more or less irregular fields. This condition is to be attributed to injury to the superior lip of the calcarine fissure. There was no case of superior horizontal hemianopsia, probably for the reason that the inferior lip of the calcarine fissure is so near the cerebellum and the lateral sinus that an injury in that region is fatal. Quadrant anopsia is not uncommon. Hemianopic scotomata are divided into three categories: first, macular and paramacular; second, purely macular; third, multiple. The perimetric examinations are most important, because the patient is usually unconscious of the nature of his trouble and complains only that his eyes tire rapidly or that he has difficulty in reading. From a study of these cases it appears that the macula is represented in the cortex at the point of the occipital lobe. The hemianopic scotomata were homonymous, but not mathematically identical. Among the cases difficult of interpretation were cases of ring scotoma or double ring scotoma. Out of three hundred cases of head injury examined thirty-one showed changes in the visual fields. In some of the others the occipital lobe was injured, but in these cases the projectile was either deep in the occipital lobe or on the external surface. The opinion of Henschen that the visual cortex is confined to the region of the calcarine fissure is confirmed by these observations. In the majority of cases the X-ray examination showed an intracerebral projectile. An increase in the scotoma indicates an abscess formation and operation is advisable. In other cases an operation usually increased the scotoma and is therefore not advised.

2. *Reflex Nervous Disturbance.*—The nerve troubles consecutive to the injuries of an extremity are divided into three groups: those due to injury to the nerve trunks, the hysterical and the reflex. Those of the first group are recognized quite easily but it is difficult to separate the other two. The

authors report nine cases in which, following slight injuries, there was difficulty in the use of the leg. In these cases there was more or less limitation of movement, slight atrophy, slight hypothermia and very slight increase in the knee jerk in the affected limb. In all of the cases chloroform narcosis resulted in loss of the other reflexes, but an exaggeration of the changed knee reflex, also for a short time after the narcosis the knee jerk was markedly increased. During narcosis the limitations of motion persisted. The elective exaggeration of the tendon reflex shows the depth of the nervous disorder which may be provoked by a peripheral lesion and explains the tenacity of the clinical manifestations. These researches establish a distinct difference between reflex disorders and those due to hysteria, nervousness, simulation or conscious exaggeration.

3. *Relation of Tremor to Emotion.*—In a large number of cases, probably the majority, in which there is a tremor called nervous or hysterical, it is an expression of the emotion of fear. In many cases the fear is subconscious or it is the residue of an emotion that is forgotten. In the psychotherapy of these cases the patient should not be urged to stop trembling, but to stop fearing.

4. *Camptocormia.*—The name is coined by Souques from two Greek words meaning "I flex, I curve" and "the trunk." In these cases there is a permanent flexion of the trunk with modifications of the external form of the body that are the same as those seen in the flexion of the trunk in a normal person.

5. *A Peculiar Limping.*—This limping often follows injuries that have been cured and no lesions of the leg can be found. There is an appearance of shortening, but measurement shows that this is due to tilting of the pelvis. They are not hysterical and treatment by electricity, suggestion, etc., is without effect. The author explains them as the result of habit. The patient adopts this attitude to relieve pain and after the pain disappears he continues it. Most of these patients are neuropathic or eccentric. "The habitude plus the aptitude equals the attitude."

6. "*Hyperesthesia.*"—Really means increased reactivity or increased sensibility to pain, which is hyperalgesia.

7. "*Sign of Sterno.*"—As one percusses lightly the third cervical vertebra of the normal individual there is no response, but in cases of meningitis the sterno-cleido-mastoid contracts noticeably. This reflex is also noticed in those who have been exposed to the effect of explosion in their vicinity. This sign will persist for two or three months after cure in cases of meningitis. It is absent in hysteria and, therefore, valuable for diagnosis. It is not a bone reflex, because the third cervical spine is not prominent and percussion on other cervical spines such as the sixth does not produce the reflex; also simple irritation of the skin is not sufficient to produce the reflex.

Monatsschrift für Psychiatrie und Neurologie

Abstracted by Dr. J. W. Moore, Beacon, N. Y.

(Vol. 37, No. 3, March, 1915)

1. An Explanation of Certain Retardation (Blocking) Symptoms. A. Pick.
2. The Present State of our Knowledge of Aphasia. C. Mingazzini.
3. The Physiological Restlessness of the Pupil and the Psychic Pupillary Reflex. E. Förster and E. Schlesinger.
4. Contribution to Comparative Race-psychiatry. H. Budel.

1. *Retardation.*—Upon certain retardation or "blocking" symptoms the author places a new interpretation. Our normal behavior depends upon a correct balance between impulse and repression. In many cases of "blocking" it is probable that the real disorder is an impulsive one and that the sudden stopping is a compensatory exaggeration of the natural repression.

2. *Aphasia.*—Our previous belief that the seat of motor aphasia and the location for memory of speech mechanism lay exclusively in the third left frontal gyrus must be modified. Careful studies and additional anatomical material have shown that the Broca area must be extended to include not only the pars opercularis of L. F. 3, but also the pars triangularis, the anterior part of the Island and perhaps of the Rolandic operculum. This larger area von Monakow refers to as the enlarged Broca area. Experience has shown that lesion of the Broca area does not always cause motor aphasia in a right-handed person or vice versa. We have learned also that in children the destruction of the Broca zone almost never produces motor aphasia. This is true also of parrots. Apparently then the speech center has come in the course of time and according to the laws of economy to be located only on one side but the anatomical and physiological mechanism is intact on the other side and can be brought into use if necessary. It can be shown that not only lesions of the cortex of the areas mentioned but also those of the deeper layers and of the corpus striatum can produce motor aphasia. In order to show this more graphically the author has made schematic drawings showing the outlines of the lesions in a number of reported cases where corpus striatum lesions with intact cortex have produced motor aphasia. From a consideration of the large number of cases thus charted the following statements seem justified: Motor aphasia with partial recovery results from lesion of the anterior third of the left lenticular nucleus, marked dysarthria from lesions of the posterior third, complete anarthria if the whole nucleus is destroyed and permanent motor aphasia if the pre-supralenticular zone on the left is destroyed. The existence of a motor speech path is not yet safely established. Cortical deafness occurs if the transverse temporal gyri and their efferent connections are destroyed on both sides. In sensory association-aphasia the connections from the posterior aphasia region are chiefly affected, destruction of the association fibers of the left parietal lobe being essential. Pure forms of motor or sensory association-aphasia are practically unknown. Motor association-aphasia depends upon interruption of connections of the anterior motor aphasia region, the pre-supralenticular region being usually intact. The ability to repeat words, which is preserved in both forms of association aphasia, requires the integrity of the pre-supralenticular area or at least the callosal radiation to that region. From a clinical standpoint it is not possible to positively deny the existence of a zone (middle portion of inferior temporal gyrus), the destruction of which will cause word amnesia. Agraphia cannot be assigned to a particular zone. It occurs when the various components of the writing mechanism, as the knowledge of the meaning of the written word or the ideatory-kinetic memory of the graphic movements, are involved. Even in right-handed persons these engrams may be located in the right hemisphere. The article contains numerous illustrations and photographs of anatomical specimens.

3. *Pupil-reflex.*—By use of a pupillometer devised by one of the writers the pupil can be examined under conditions which preclude accommodation reaction entirely. The physiological restlessness of the pupil never fails in normal individuals. It is lacking in dementia præcox, as is also the usual dilating of the pupil to conscious sensory or psychic stimuli. This is due, of course, to the dulness of the psychic reactions in this disease.

4. *Race-psychiatry.*—Observations on relative frequence of various forms of insanity in different races. The material is from Russia and comprises largely a class of people whom we seldom see in the United States.

(Vol. 37, No. 4, April, 1915)

1. Contribution to the Somatic Symptomatology and Diagnosis of Dementia Præcox. J. H. Schultz.
2. A Case of Acromegaly with Hypophyseal Cysts. H. Weyer.
3. Association Tests in Alcoholics. J. B. Jörger.

1. *Dementia Præcox.*—The author gives much of his own experience and reviews the work of other observers in applying various clinical somatic tests to cases of dementia præcox. This includes the results of experiments with the Abderhalden reaction which show a reaction in the blood-serum of dementia præcox against lymphatic and thyroid tissue and often also against the brain cortex and sexual-organ tissue. The pathology of dementia præcox has been shown by Alzheimer often to include glia changes and cortical destruction. All efforts to find a somatic test which would be useful in diagnosis have been disappointing. Adrenalin mydriasis occurs in dementia præcox and not in other functional psychoses or neuroses. But it is not constant in dementia præcox and organic cases often show it. The adrenalin content of the blood is usually low in dementia præcox. No satisfactory cutaneous reaction has been found for the disease.

2. *Acromegaly.*—The author first summarizes the history of the study of the hypophysis from the first description of acromegaly and its association with hypophyseal enlargement to the present time. Various interpretations have been placed upon the cellular constituents of the gland and their relation to function. The "chief" cells of the anterior lobe have been regarded as an early stage, the eosinophile cells as at the height of secretion and the basophiles as the end stage of one and the same cell-type. Erdheim does not agree with this opinion, but thinks all are different kinds of cells and that none is secretory in character. It is known that in pregnancy there is decided enlargement of the hypophysis (in one case causing bi-temporal hemianopsia during each pregnancy) and that the "chief" cells undergo a change and their protoplasm becomes eosinophilic. Various theories have been advanced regarding the meaning and possible function of the colloidal masses in the pars intermedia. As yet, however, the histology of the gland as well as its physiology are only dimly understood. Of the diseases resulting from disordered function of the hypophysis acromegaly is one of the most interesting. The consensus of opinion now is that this condition is due to a hyper-function and in the great majority of cases an adenoma of the gland is found. The genital dystrophy accompanying acromegaly is an independent symptom and is due to pressure upon the posterior lobe caused by the enlargement of the anterior lobe. Adiposity is infrequent. Glycosuria and polyuria occur frequently but no sufficient reason has been found for these symptoms. The case described showed clinically very marked enlargement of the extremities and extreme atrophy of the testicles. The pituitary affection consisted of large epithelial cysts causing marked increase in the size of the gland and enormous multiplication of the eosinophile cells of the anterior lobe. The enlargement with resulting pressure on the posterior lobe is to be looked upon as the cause of the testicular atrophy.

3. *Association in Alcoholics.* (A continued article.)

Neurologisches Centralblatt

Abstracted by Dr. L. Pollock, Chicago, Ill.

(October 1, 1915, No. 19, Vol. 34)

1. A Case of Tabes Dorsalis with Unusual Coördination Disturbances in the Trunk of Acute Onset. G. Bikeles.
2. Concerning the Naming of Nervous Disorders in Expert Opinions. W. Cimbal.
3. Concerning the Controversy over the Traumatic Neuroses. Kirk Hildebrandt.

1. *Tabes Dorsalis.*—A report of a case of tabes dorsalis occurring in a man aged forty, who at the age of twenty had a luetic infection. After the development of the clinical picture of tabes, within a period of three days a very marked difficulty in walking occurred, which was due chiefly to ataxia of the trunk. Bikeles calls attention to the disturbance of superficial reflexes in tabes dorsalis of acute onset or in acute exacerbations of this disease.

2. *Names and Expert Opinions.*—Cimbal criticizes the terms traumatic neurosis, hysteria, neurasthenia, liability or pension hysteria, etc., and feels that all obscure and un-German names of groups are harmful and should be eliminated.

3. *Traumatic Neuroses.*—A discussion of the traumatic neuroses in which Hildebrandt calls attention to the practical consequences of an understanding of these conditions. He states that the compensation law tempts to exaggeration and as a result of the teaching of traumatic neurosis such exaggerated complaints are ascribed to the traumatic neurosis. We are dealing not only with the medical question, "are the complaints real?" but the social question, "will the afflicted individual return to work if hope of compensations were removed?" He warns against neglecting the traumatic neurosis, however, and assuming an unjust attitude towards the neurotic individual.

(October 16, 1915, No. 20, Vol. 34)

1. Concerning the Increased Sweat Secretion on the Paralyzed Side in Cortical Lesion following Pilocarpine Injection. G. Bikeles and Josef Gerstmann.
2. Investigations with Sweat Producing Methods in a Case with Complete Spastic Paraplegia as the Result of Caries of the Ninth Dorsal Vertebræ. G. Bikeles and Josef Gerstmann.
3. The Nachbewegungsphänomen (Katatonic Experiment of Kohnstamm). J. Csiky.

1. *Sweating in Hemiplegia.*—In a study of eleven cases of gunshot injury to the skull where, with one exception in which the lesion was located in the gyrus angularis, the injury was in the psychomotor region or near by, Bikeles and Gerstmann found that of seven cases of a group in which spasticity was absent, injection of 0.01 of pilocarpine was followed in six cases by a more marked secretion of sweat on the paralyzed side. In five cases of a group of spastic phenomena .01 of pilocarpine caused a more marked sweating on the paralyzed side. Inasmuch as the upper extremities and the face showed this difference a greater number of times and to a more marked degree Bikeles and Gerstmann conclude the psychomotor region, especially of the face and upper extremities, lies in closer relationship to the sweat center.

2. *Sweating in Paraplegia.*—Bikeles and Gertmann conducted a series of experiments with sweat-producing substances (pilocarpine, ammonium acetate, lime tree tea) in a case of complete spastic paraplegia caused by caries of the ninth dorsal vertebra. They failed to produce sweating in the lower extremities although the face, chest and upper abdomen showed marked perspiration. In the one case with a lesion of the ninth dorsal vertebra a spastic paraplegia existed; in the other, a case of osteomyelitis of the twelfth dorsal, a flaccid one was present. Bikeles and Gertmann conclude that it is impossible from these experiments to localize the sweat center for the lower extremities in the spinal cord; fibers from the lower dorsal segments may course downwards or from the upper or lumbar segments to the corresponding white rami communicantes.

3. *Katatonic Movements.*—Csiky takes issue with Kohnstamm and Rothmann concerning the cause of the Nachbewegungsphanomen which they described. This phenomenon consists of an after-contraction or movement which appears after long continued movement against resistance, as for instance may be obtained by pressing forcibly the extended lower arm and forearm held near the body against the wall for a period of a half to one minute; after a short latent period the arm spontaneously raises itself. Kohnstamm attributes this to a tetanus of the stretched musculature overcoming the will innervation. Rothmann states further that the involuntary or will-free after-movement finds its innervation in the subcortical region of the brain. Csiky, after obtaining the same phenomenon following faradic tetanus, concludes that the Nachbewegungsphanomen is really an idiomuscular contraction that, originating in the fatigued muscle, extends itself to the whole muscle mass.

(December 16, 1915, No. 24, Vol. 34)

1. Lipodystrophia Progressiva. Ernst Jolowicz.

1. *Lipodystrophia.*—Jolowicz reports a case of an unmarried woman, aged 24, whose face, arms and chest progressively and slowly became lean at the age of eight. At the same time an accumulation of fat occurred about the hips and thighs. He says that the term lipodystrophia progressiva suggested by Simons does not entirely conform with the course of the disease, inasmuch as in this case the condition came to a standstill in childhood. He says that we are dealing with an isolated trophic change in the subcutaneous fat and agrees with Simon that there is a possible disturbance of an endocrinous gland.

Book Reviews

THE PSYCHOANALYTIC METHOD. By Dr. Oskar Pfister. Authorized Translation by Dr. Charles Rockwell Payne. Moffat, Yard and Company, New York. 1917.

The translation of this well-filled volume has opened a mine of wealth to English reading students and workers in psychoanalysis. The author's broad and profound scholarship, together with his acumen of thought, have afforded a presentation of psychoanalysis in its relationship to general psychological and philosophical thought, with an application of psychoanalytic principles which is exceptionally stimulating and practical.

The book is a marvel of condensation without sacrifice of significant detail and of compactness without loss of interest or clearness. This is plainly felt to be due to the intellectual qualities of the author and none the less to a markedly human note which manifests itself throughout the setting forth of his keen and helpful analyses, and rings out clearly and distinctly in the final summing up of the service which psychoanalysis can and should render to pedagogy. Psychoanalysis is essentially humanistic. It meets here, therefore, an exponent abundantly fitted for its service whether in its practice or in discussion of its theory and method. There is a virile quality about both Pfister's intellectual equipment and its infusion with this deep and broad humanism which explains the rapid succession of successful case histories, whose presentation holds the reader's attention. One reads through to the end to find how such truth of vision grasps the application of psychoanalysis to the problems of the young, how it belongs to the best and highest conception of all education and training, relation to parents, question of punishment, sexual education, moral training and religious belief and values, and one understands then how this pastor, pedagogue and friend of the young has gone straight to the mark and helped so many lives to understand themselves and turn decisively about into freedom.

A literal review of the contents of this book would be impossible, so much is brought together in its pages. There is a brief history of the rise and growth of psychoanalysis and its diffusion through the world. Each one of the concepts which have entered into psychoanalysis as part of its working hypotheses receives concise but comprehensive treatment, with the same practical directness noted in the case reports. The concept of the unconscious is treated at length. Repression, fixation, transference, all the terms become familiar to students of this practical psychology receive new vigor of application in the author's keenness of thought and conciseness of expression. They are dealt with in separate short sections either under Part I, Theory of Psychoanalysis or Part II, Technique of Psychoanalysis. They are equally valuable to physician or pedagogue, although designed first of all to bring the importance and applicability of both theory and practice to the latter.

Such sections as the one dealing with the question of transference must impress every reader, unless he be blindly prejudiced, indeed, with the responsibilities and the possibilities of a service based on the high character of psychoanalysis. The transference, as discussed by the author, demands a clear-eyed self-control but one which recognizes that wholesome human sym-

pathy which one feels emanates throughout the book from the author's own special ability to assume this responsibility of the analytic procedure. This section on transference ranks close to these same discussions by "the father of psychoanalysis," as Pfister delights to designate Freud.

Pfister's independence of thought separates him at times in slight degree from some of Freud's conclusions but these are but minor differences. He acknowledges throughout not only the authority and leadership of the latter, but his own repeated indebtedness for elucidation in many points either through personal suggestion or in general study of Freud's work. As President Hall has stated in his introduction to this translation, Pfister "has the . . . advantage of having held sufficiently aloof from not only the controversies between Freud and Adler but those between what might be called the Vienna and the Zurich schools."

Pfister's service is a special one, to bring psychoanalysis and its possibilities before educators, and even more to point out the crying need for some such service, which, to his keenness and breadth of vision, psychoanalysis seems eminently fitted to supply. The introduction to the original edition, written by Freud himself, emphasizes the importance of this pedagogical application side by side with the therapeutic and suggests the widening field which psychoanalysis is destined to occupy.

Every reader will feel a special appreciation of Payne's successful effort in penetrating the author's thought and rendering it thus faithfully.

JELLIFFE.

PRINCIPLES OF HUMAN PHYSIOLOGY. By Ernest H. Starling, M.D., London, etc., Jodrell Professor of Physiology in University College, London. Second edition. Lea and Febiger, Philadelphia.

The English school has been recognized for years as especially strong on its physiological side. The present work by Starling, now in its second edition, is cumulative evidence bearing upon this. It is a masterly work, excellently written, clearly conceived and provocative of earnest and thorough work.

The first section on General Physiology is excellent. The structural, material and energetic basis of the body is his classification. In this no space is given to the energy transformers at psychical levels, but possibly this is psychology and not physiology. Book II on the Mechanism of Motion and Sensation are not so systematically conceived although most satisfactory. The chapter on the vegetative nervous system is all too brief in view of its immense importance at the physico-chemical level of metabolic activity. Furthermore, our prejudices would be better satisfied if it began the chapter on movement mechanisms, rather than being switched in between the cerebral hemispheres and the physiology of sensation. The chapter on Ductless Glands should be placed with this on the vegetative nervous system, we believe.

Book III on the Mechanisms of Nutrition follows and a final short chapter on Reproduction closes this best human physiology of the period.

JELLIFFE.

PRINCIPLES OF GENERAL PHYSIOLOGY. By William Maddock Baylis, M.A., D.Sc., F.R.S., etc., Professor of General Physiology in University College, London. Longmans, Green and Company, New York and London.

This is one of the most fascinating works on physiology which we have had occasion to read in the past decade. Dealing as it does with general principles, it constantly opens up vistas into which the specialist in any line of medicine can profitably project himself and his workmanship.

The work starts with fundamental energetic concepts, dealing with the

physico-chemical problems of the cell, surface actions, colloidal states, the permeability of cell membranes—this paragraph is rich in suggestion to the neurologist dealing with interferences in the reflex arc at the synaptic junctions—osmotic pressure, the properties of water, hormones, catalyzers, enzyme action, oxidation and reduction, receptors, connectors, effectors, etc. All of these are very minutely gone into and in such a manner that their mastery is possible and its applications profitable.

The more recent work in vegetative neurology renders it important that these fundamental biological principles be grasped, else our formulation of disordered function will remain at a purely descriptive level.

The later chapters deal with subjects more extensively treated in the formal physiologies, such as nutrition; secretion; digestion; reflex action; nervous system, peripheral and central; respiration and the circulation of the blood. The book closes with a chapter on hormones, drugs and toxins, which seems hurried and inadequate in view of the masterly manner of the beginning of the work. Each chapter ends with a summary followed by references to important literature. Besides the usual illustrations, there are scattered throughout the text most excellent portraits of the leaders in physiological thought, such as Claude Bernard, Emil Fischer, Graham, Descartes, van't Hoff, Priestley, Leeuwenhoek, Ludwig, Ehrlich, Ostwald, Lavoisier, Helmholtz, Pfeffer, Harvey and Pawlow. These pictures are well chosen and make an especially pleasing feature of the book, giving it a human touch and adding to its historical and literary value. Such illustrative material might well be introduced into our more special text books, even if they are ephemeral.

Since Verworn's masterly work of the same general type no work of its kind has been so commendable.

JELLIFFE.

MANUAL OF PSYCHIATRY. By J. Rogues de Fursac, M D., and A. J. Rosanoff, M.D. John Wiley and Sons, New York; Chapman and Hall, London.

The appearance of this book in its fourth edition attests its value, while its serviceableness will be by no means decreased by the addition of much important material. It presents a very wide range of psychiatric topics, with particular emphasis and elaboration in regard to certain important problems in which psychiatry joins hands with general social welfare and prophylactic measures.

These appear in the first division of the book which is concerned with General Psychiatry. A clear yet concise scientific outline of heredity is introduced into the discussion of general etiology and there is here and in the chapters on the Practice of Insanity a presentation of the prevalence and distribution of mental disorders in our own country which offers a most rational basis for prevention and limitation and for effective eugenic study and activity. Control of alcoholism and of syphilitic infection, as well as medico-legal problems are treated in the same comprehensive and practical manner.

The general psychiatric material presented in its etiology, symptomatology and its relation to practice, in the technical and in this broader sociological sense, is followed by a special psychiatry which deals with mental disorders in their specific varieties. Here, too, the descriptions are full but not redundant. Kraepelin's classifications are followed as the accepted guide in the present psychical world. The salient factors in each clinical picture are given in regard to symptoms in the general picture and in the varieties which any particular group may manifest, their onset, course of development, accompanying somatic disorders, with reference to diagnosis, particularly differential diagnosis, and prognosis. Pathological features are noted and etiology and treatment receive some degree of consideration.

The descriptive portion of the work is thus of very full value to the student, especially through its concise yet very comprehensive form of treatment. The small space given, however, to etiology and treatment are not due merely to the difficulties which obscurity of cause and progress of mental deterioration present nor to the inaccessibility of mental patients and the inevitableness frequently of the final outcome of pathogenic processes. The ample descriptions of the book should and might have received the illumination of an insight which went deeper into the individual factors working on a constitutional basis and meeting the exigencies of other contributing or of precipitating causes by an inadequate reaction which threw the patient out of harmony with the real world. This would have explained many of the symptoms described and assisted toward the discovery of the fundamental basis of such definite advanced forms of reaction as the well-developed alcoholic psychosis, cerebral syphilis and the like.

The authors have not absolutely neglected this but they have not opened to the student the unconscious realm of mentation whence apparently arise the automatisms which they mention occasionally and where all the larger field of etiology seems to lie. The illustrative case histories which they present strikingly confirm such a conception of an unconscious sphere of mental life which dominates in mental derangement or into which the deteriorated patient withdraws.

Some elaboration of this phase of mental life, beyond the rare and unexplained references to the "subconscious," would have amplified the etiological picture and offered richer suggestions for prophylaxis and treatment than a purely symptomatic presentation, however complete, can afford.

WHITE.

DIAGNOSIS AND TREATMENT OF SURGICAL DISEASES OF THE SPINAL CORD AND ITS MEMBRANES. By Dr. Charles A. Elsberg. W. B. Saunders & Co., Philadelphia and London.

This is the best work we have seen in spinal cord surgery. This means that it is not only reliable surgically but neurologically as well.

It is clearly written, well expressed, logically arranged and beautifully illustrated.

The author treats his subject preëminently as a neurologist, as it should be, and gives an excellent idea of the methods of examination and the means to be taken to get best at the difficulties.

It is a practical manual. There are some omissions which should be corrected in a new edition. The entire examination of the spinal cord pathways in their functional capacity is carried on at the sensori-motor level. Little or no recognition is given to the examination of disorder of the pathways utilized by the viscera-vegetative level and only a few phrases concerning the necessary differentials between functional disturbance at the psychological level. Thus for the student of disordered nervous functioning as brought out in the present war, many omissions stand out which might have been included, but these things did not lie within the author's intention.

All things considered, it is a splendid piece of work.

JELLIFFE.

THE ORGANISM AS A WHOLE. FROM A PHYSICO-CHEMICAL VIEWPOINT. By Jacques Loeb, M.D., Ph.D., Sc.D. G. P. Putnam's Sons, New York and London.

This is an exceedingly lucid and forceful argument for a mechanistic conception of the activities of living matter. The successive chapter headings give an idea of the scope of the author's thought—Differences between

Living and Dead Matter, Chemical Basis of Genus and Species, Specificity in Fertilization, Artificial Parthenogenesis, Regeneration, Determination of Sex, Mendelian Heredity, Animal Instincts and Tropisms, Influence of Environment, Adaptation, Evolution, Death of the Organism. An enormous amount of recent biological research has been brought together in a most fascinating manner and all made to support mechanistic conceptions. The author has stated his position clearly and with exceptional brilliancy. The work should be read for the value of such a statement. It is a thoroughly adequate outline for an understanding of fundamental physico-chemical phenomena, which are recognized by all as a certain grouping of relational activities, by which the energy of the world may be utilized by the organism. It signally fails to perceive or to recognize that there are other relational activities, in which the physico-chemical activities may play a part, but not the whole part. No one, for instance, doubts that a grave alteration in the hormone activity of the thyroid causes a great modification in physico-chemical processes of the human body. Such a hyperthyroid state has been known to follow immediately upon the loss of a loved one, or the burning down of a house. Not even Loeb would maintain that the physico-chemical alterations of the hyperthyroid patient killed the beloved son or burned the cherished house down, and yet much of the mechanistic argument attempts just this sort of a situation. The hormone is a type of a tool for energy-transformation, and a highly important one. The reflex is a higher, or more elaborately devised tool for similar purposes—and will bring the hormone into activity to further its functions, while the symbol (*i. e.,* the thought, the idea, the concept, the feeling) is the more completely elaborated type of tool for energy transformation, and to our way of thinking the most important and most valuable. Thus Loeb's chapter on Evolution is most unsatisfactory, both in size and in method of handling, for there is not the least scintilla of evidence that the general problem of successive structuralizations as embodiments of functional adaptation is even glimpsed in this book, and if anyone would speak of the organism as a whole, certainly all of its tools for energy-transformations should be discussed and not the physico-chemical changes that accompany or make such transformations possible, be held to be the whole of the organism's activity.

JELLIFFE.

REST, SUGGESTION AND OTHER THERAPEUTIC MEASURES IN NERVOUS AND MENTAL DISEASES. By Francis X. Dercum, A.M., M.D., Ph.D. Philadelphia, P. Blakiston's Son and Co.

The author has taken pains in this enlarged edition of a former work to make plain the changes which take place in the normal functioning of the body and the result upon tissues in their structure and function of the products of such changes. He lays emphasis upon the morbid changes produced as he says by "persistent excess of function." Upon these he bases his discussion of the neuroses which he calls the fatigue neuroses, and outlines the procedure and the rationale of the rest cure for these and other neurotic disturbances. These are considered under the various descriptive terms adopted or modified from those assigned to them by older authors, hysteria, neurasthenia, neurasthenoid states. Under psychasthenia are subsumed "the neurasthenic-neuropathic insanities." There is a discussion also of other various forms of mental disease, in which, neither in the description afforded them, nor the brief outline for treatment is there anything that seems really to enter into the problem in a manner to reach the causative factors and therefore discover an effectual means of understanding and treatment.

Stress is laid throughout upon physiological methods rather than phar-

macological, which are merely auxiliary to the former in special conditions. Psychotherapy receives a special discussion but there is such an utter ignorance of the fundamental power working in human nature that these discussions reveal chiefly complete lack of understanding of their actual effectiveness or their ineffectualness with human ills. An actual falsity of statement, for example, in the assertion that "neither Freud nor his followers gave to Janet's discovery either recognition or attention" reveals the extent to which lack of understanding and prejudicial blindness has led the author.

While the book grants a certain review of obvious mental conditions, it falls far short even in that of what might be expected from an experienced physician. There is nothing to answer the demand of the student of these problems as to the meaning of function which utilizes or unnecessarily exhausts tissues, as to the force at work in the human economy which leads to a normal, healthy employment of tissues and mental faculties alike, or an exhaustive misdirection of them. No light is thrown upon the effort of the human being, and his success in health or failure in illness by such shallow descriptiveness as is contained in "insanity of indecision" or "insanity from deficient will" and the same superficial discussion that accompanies these terms. "Full rest treatment" with a nurse who "should tactfully endeavor to break up absurd associations upon which special fears or other obsessions depend" tells nothing, takes no account of the inherent effort of the patient, which is vainly endeavoring to attain an expression which is a true self-assurance and health. The superficial platitudes of this book, whatever their limited descriptive value, omit the one thing needful, which, however imperfectly, have yet given efficacy to other misunderstood forms of treatment. Some of these have utilized the essential factor blindly; psychoanalysis, we claim, uses understandingly and advisedly the underlying dynamism of the human being to find his ills and reach the source of his self rehabilitation.

L. Brink.

A Point Scale for Measuring Mental Ability. [Monograph No. 1 of the Psychopathic Hospital, Boston, Massachusetts.] By Robert M. Yerkes, James W. Bridges and Rose S. Hardwick. Warwick and York, Inc., Baltimore, 1915.

This small volume is an exceedingly useful one in the examination of the intellectual grade of children and adults. The system which is here explained and outlined was devised as an improvement upon the older Binet-Simon one, the value of which is, however, fully recognized. Only these authors have felt that it has prepared the way and should to a certain extent give place to newer methods which themselves owe much, as these authors show, to the original one. The principal points in which they criticise the Binet-Simon scale and in which they therefore deviate from it are in the arrangement of tests in groups based upon chronological age, and the "all-or-none" method of scoring. The method here adopted of scoring by points brings out, they believe, the full value of the testing material and covers far more thoroughly the intellectual equipment of the individual and his mental activities, while the range admitted through the elimination of the chronological age groups extends the system more flexibly to all ages and allows for the mental development which is continually going on.

There is included a practical description of this point scale and its method of application, as well as examples of the results obtained. The tests are also given as well as a summary of various mental functions which they seek to cover. Norms have been established through tests upon a large heterogeneous group of average school children in which attention has been given to age, sex, language status and sociological condition.

This point system recommends itself because of the recognition of the flexibility and impossibility of definite classification in face of the human equation. The system is based upon an appreciation of these facts and not only has been constructed and set to work in accordance with them, but looks toward a future extension and applicability upon the same principle.

JELLIFFE.

THE INTELLIGENCE OF THE FEEBLEMINDED. By Alfred Binet, Sc.D., and Th. Simon, M.D. Translated by Elizabeth S. Kite. Publications of the Training School at Vineland, New Jersey.

This book will have a special practical value for those upon whom falls the problem of the understanding and care of that large class of individuals, who constitute the class of defectives in intelligence. The term feebleminded is used comprehensively in the translation, although strictly speaking there are such varying degrees of defect that the work included under that head refers to the complete idiot or to the higher grade of defect known as the moron.

The interest of these studies, translated thus appreciatively from certain earlier contributions of the distinguished authors, lies in two important directions. It presents a detailed study of such subjects whereby the psychological principles developed side by side with this application of them are illustrative of the psychogenetic point of view adopted and discussed as the only truly illuminating and explanatory approach to the understanding of feeblemindedness. As a result the writings form secondly an important contribution to theoretical psychology based upon this psychogenetic standpoint, presenting itself as a workable and interpretative method of approach.

To-day psychiatrical studies are becoming infused with this attitude of thought. This book, however, stands at the opening of such interpretative and synthetic comprehension of mental development and activity. It, moreover, makes such definite application of this in the study of character manifestation, intellectual functioning, or the reactions, both affective and intellectual, of the feebleminded, that a light is unfolded from within, a marked advance on former arbitrary descriptions of these phenomena. The authors' acumen of observation is manifested in the appraisal of each mental activity of these individuals as it appears in the tests. While there still lingers a certain use of the older terms which separated various mental functions and the different expressions of their activity, the attempt is to reach a psychology of action, of adaptability, in which these activities fit as but partial expressions of the synthetic mental process. From this as a standard character and intellectual effort are interpreted in terms of a gradual development, reaching up toward the normal, and the intelligence of the feebleminded is therefore understood in its separate manifestations as so much progress or limitation in mental evolution.

A study of the aphasia of the feebleminded leads to the same conception of a defect or retardation in this mental evolution rather than that of a misdirection of intellectual powers. The authors recognize the insufficiency of development and lack of acquisition in the case of defectives. In their study of dementia they admit rather an inertia of functioning and loss of acquisition. As an initial study to the psychiatry of the present day, this book presents a variety of suggestive and illustrative practical studies with its discussions of this psychogenetic conception of the mental evolution, its arrest and retardation on the one hand and its deterioration and loss on the other. Some of these discussions are merely suggestive, however, of the continual widening of this point of view, which has already pervaded psychiatry and such applied psychology, and which has already entered into a far wider and deeper interpretative understanding of these mental phases.

JELLIFFE.

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Figures with asterisk (*) indicate original articles and are accompanied with title. Figures unaccentuated, accompanied with title, indicate abstracts; without title, book reviews.

The Journal of nervous and mental disease